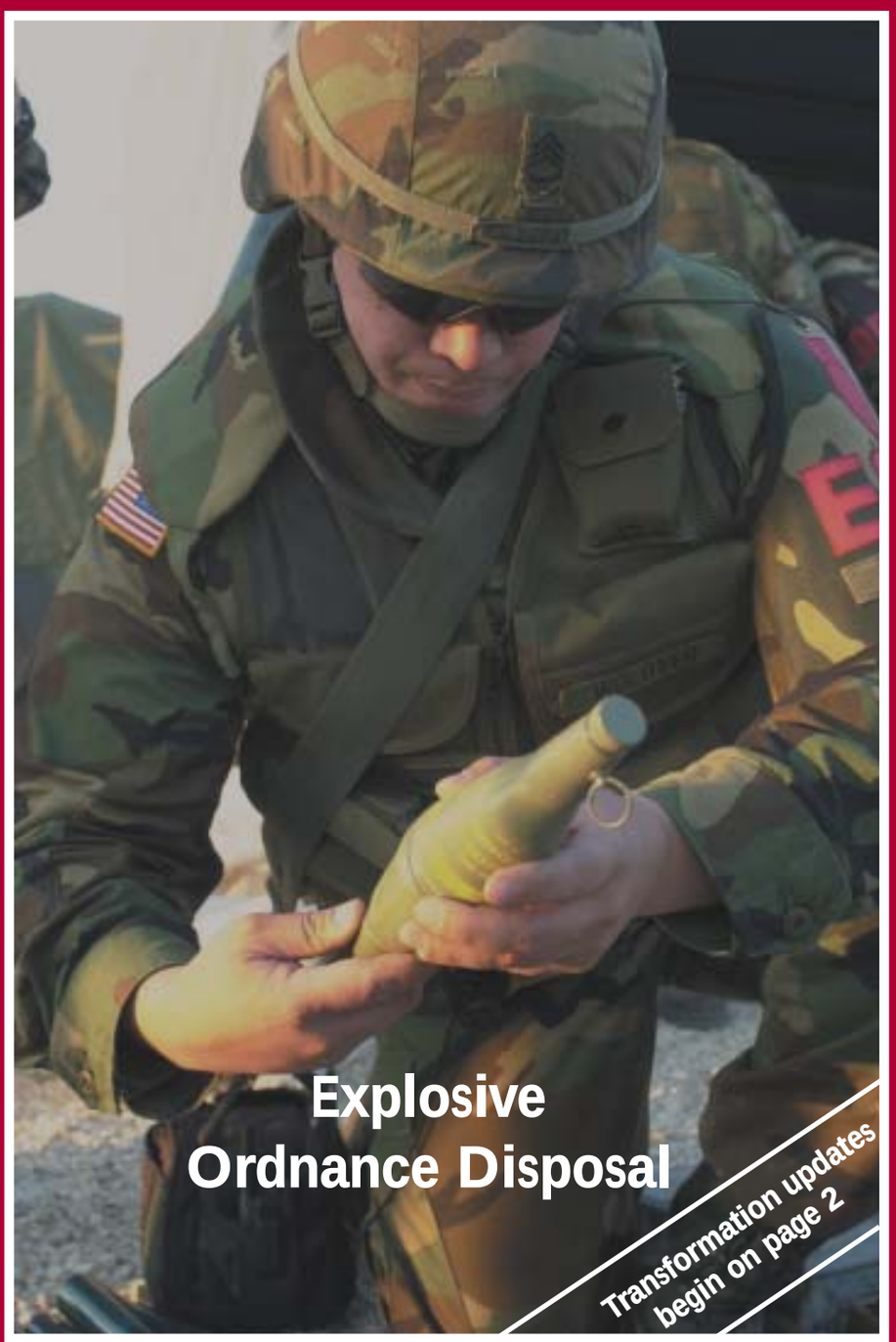
ARMY LOGISTICIAN

JULY-AUGUST 2002



Explosive Ordnance Disposal

Transformation updates begin on page 2

PB 700-02-4 Headquarters, Department of the Army

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
AUG 2002		**00-00-2002 to 00-00-2002**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Army Logistician. Volume 34, Issue 4. July-August 2002	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Army Logistics Management College,2401 Quarters Road,Fort Lee,VA,23801-1705**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**52**	

ARMY LOGISTICIAN

PROFESSIONAL BULLETIN OF UNITED STATES ARMY LOGISTICS

PB 700–02–4
VOLUME 34, ISSUE 4
JULY-AUGUST 2002

COVER

Stabilizing the environment for the people who live in an area of conflict can be a life-threatening mission. The article that begins on page 24 describes how explosive ordnance technicians searched for and destroyed weapons and explosives in Kosovo. On the cover, a member of the 62d Explosive Ordnance Disposal Company, based at Tooele Army Depot, Utah, examines foreign markings on a piece of the ordnance that was found in the caves and caverns of Kosovo.

Army Logistician (ISSN 0004–2528) is a bimonthly professional bulletin published by the Army Logistics Management College, 2401 Quarters Road, Fort Lee, Virginia 23801–1705. Periodicals postage is paid at Petersburg, VA 23804–9998, and at additional mailing offices.
Mission: ***Army Logistician*** is the Department of the Army's official professional bulletin on logistics. Its mission is to publish timely, authoritative information on Army and Defense logistics plans, programs, policies, operations, procedures, and doctrine for the benefit of all logistics personnel. Its purpose is to provide a forum for the exchange of information and expression of original, creative, innovative thought on logistics functions.
Disclaimer: Articles express opinions of authors, not the Department of Defense or any of its agencies, and do not change or supersede official Army publications. The masculine pronoun may refer to either gender.
Submissions: Articles and information on all facets of logistics operations and functions are solicited. Direct communication is authorized and should be addressed to: EDITOR ARMY LOGISTICIAN/ALMC/2401 QUARTERS RD/FT LEE VA 23801–1705. Phone numbers are: (804) 765–4761 or DSN 539–4761; Fax (804) 765–4463 or DSN 539–4463; email alog@lee.army.mil. **Reprints:** Articles may be reprinted with credit to ***Army Logistician*** and the author(s), except when copyright is indicated.
Distribution: Units may obtain copies through the initial distribution system (DA 12-series). Private domestic subscriptions are available at $21.00 per year through the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954, or visit their Web site at bookstore.gpo.gov. For credit card orders, call (866) 512-1800. Subscribers should submit address changes directly to ***Army Logistician*** (see **Submissions**, above). ***Army Logistician*** also has a homepage on the Internet's World Wide Web at http://www.almc.army.mil/alog.
Postmaster: Send address changes to: EDITOR ARMY LOGISTICIAN/ALMC/2401 QUARTERS RD/FT LEE VA 23801–1705.

This medium is approved for the official dissemination of material designed to keep individuals within the Army knowledgeable of current and emerging developments within their areas of expertise for the purpose of enhancing their professional development.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0210802

ALOG NEWS

ARMY TRANSFORMATION WARGAME OFFERS INSIGHTS

Approximately 500 Active and retired military officers from all of the armed services and eight allied countries joined their civilian counterparts from other Government agencies and academia to participate in the 2002 Army Transformation wargame "Vigilant Warriors," held 21 to 26 April at the Army War College at Carlisle Barracks, Pennsylvania.

The Army Training and Doctrine Command conducts the wargame annually for the Chief of Staff of the Army. This year's game centered on the Army's transformation to an Objective Force as a result of the changing security challenges of the 21st century. In an effort to empower soldiers to be more deployable, dominant, agile, and able to exploit current and future technology fully, the Army is focusing on a complete transformation of the Army that, in addition to weapon systems, includes doctrine, training, logistics, organization, and leader development.

"The transformation challenge we logisticians face is to enhance warfighter sustainment while simultaneously reducing the battlespace logprint," said Major General Terry E. Juskowiak, commanding general of the Army Quartermaster Center and School at Fort Lee, Virginia.

The wargame examined the ability of the Objective Force to respond to a variety of crises, from homeland security to a major theater of war. Objective Force units were required to deploy rapidly to multiple locations as part of the joint force and defeat a variety of enemies.

"Improvements in high-speed ships, both strategic fast sealift and intratheater support vessels, some of which we already see on the market today, will enable the Army's Objective Force to deploy quickly from CONUS [continental United States], or its forward stationed locations, to anywhere on the globe, nearly as fast as we can move by air," said Major General Mitchell H. Stevenson, commanding general of the Army Ordnance Center and School at Aberdeen Proving Ground, Maryland, who acted as J4 for one of the theaters of operation played in the wargame.

The wargame clarified the necessity of integrating all of the instruments of national power—diplomatic, information, military, and economic.

One of the key insights of the wargame suggests that countering future adversaries, who will employ both conventional and unconventional means, demands a new way to fight. The force must be responsive, lethal, and survivable at the strategic, operational, and tactical levels of war in order to dissuade and deter potential adversaries and, when required, decisively defeat any enemy.

Another insight of the wargame indicates that transforming the Army entails significant change in the Army's culture, its central philosophy and institutions, and the way it leverages technology and its processes for change.

"Perhaps the most profound and challenging transformation the Army faces will be changing how we train soldiers and develop leaders," said Lieutenant General James C. Riley, commanding general of the Combined Arms Center at Fort Leavenworth, Kansas, and executive director of the wargame. "The contemporary operational environment requires leader traits and behaviors [that are] far beyond the requirements of the past. These leaders must operate comfortably in ambiguous, uncertain situations while facing an uncooperative, adaptive enemy who is a master at coming at them in different ways. This means our leaders must be innovative risk takers who operate aggressively, leaders who are masters of our technical means for battle command [that] will facilitate their agility and intuition so they can actually see first, understand first, and act first."

LOG LEADERS DISCUSS TRANSFORMATION

Nearly 100 senior Army logisticians met in Richmond, Virginia, on 22 and 23 May to discuss Logistics Transformation. The discussions took place during the annual Senior Commanders Conference, sponsored by Lieutenant General Billy K. Solomon, commanding general of the Army Combined Arms Support Command at Fort Lee, Virginia. General Solomon's objective for this

(News continued on page 46)

Maneuver Sustainment for Army Transformation

by Larry L. Toler

In his vision for a more strategically responsive Army, Chief of Staff of the Army General Eric K. Shinseki tasked Army logisticians to achieve three maneuver sustainment goals in support of Army Transformation—

- Reduce the logistics footprint in the combat zone.
- Reduce deployment timelines.
- Reduce the total cost of logistics while maintaining warfighting capability.

As the Army reduces the maneuver sustainment footprint in the combat zone, the deployment timelines improve and tactical mobility increases. The challenge will be to sustain the momentum of the strategic deployment.

Reducing deployment timelines refers to General Shinseki's goal for the Army to be able to deploy one brigade in 96 hours, one division in 120 hours, and five divisions in 30 days to deter any kind of threat anywhere in the world. If the deterrence force can be deployed quickly enough, the Army can keep the enemy from establishing a geographical and tactical advantage. The faster the deployment, the more options there are for ensuring strategic and tactical overmatch.

Reducing logistics costs without reducing warfighting capability is one way to make more resources available for the first two goals. The initiatives needed to accomplish this goal center on improving business processes and reducing overall demand for sustainment. Business process improvements flow around automated information systems such as the Global Combat Support System-Army (GCSS-Army) and initiatives like the Single Stock Fund and National Maintenance Manager concepts. Reducing demand for sustainment includes designing and fielding common chassis for vehicles, greatly reducing fuel consumption, and producing more reliable spares and repair parts. If the requirement for sustainment can be reduced, the personnel required to provide that sustainment will be reduced accordingly. This has a ripple effect that ultimately reduces the sustainment required by the sustainers (support to support).

The Army Transformation

Responsiveness, deployability, agility, versatility, lethality, survivability, sustainability, and trainability—these are the cornerstones and enduring principles that will enable the Army, through its Transformation efforts, to execute its portion of the National Security Strategy and the National Military Strategy.

What does it take to make these principles a reality? World events do not allow the Army the luxury of a "time out" to consider where it has been, where it is now, and where it needs to be. While the Army is developing its future plans and prosecuting various levels of conflict today, it must move forward simultaneously along the road to Transformation.

In keeping with the Army Vision; Joint Vision 2020; the Chief of Staff of the Army's White Paper, *Concepts for the Objective Force*; and draft Army Training and Doctrine Command Pamphlet 525–3–0, Objective Force Operational Concept, the Army Combined Arms Support Command (CASCOM) has developed maneuver sustainment concepts that will build, generate, and sustain combat power for the Objective Force. When logisticians successfully execute these sustainment concepts, the maneuver and support elements will be able to see first, understand first, act first, finish decisively, and be masters of transition. It will not be business as usual.

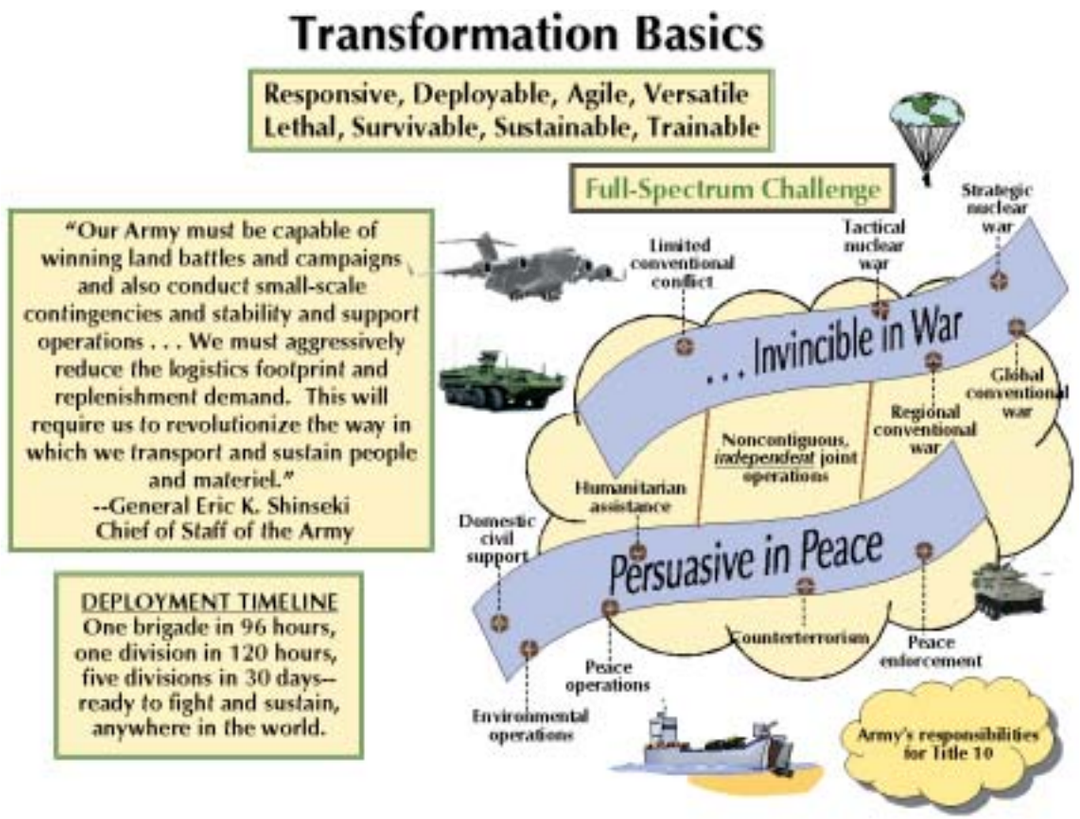
Responsiveness

The Objective Force must be responsive to any threat, over any distance, within extremely short timeframes, and must be able to sustain its deployment momentum. Deployment of the Objective Force will require near 100-percent force readiness at home stations and the ability to transition immediately from local support to national and organic sustainment. The transformed Army must be able to establish and operate an adaptive, rapid, and responsive distribution-based logistics system anywhere in the world within hours of notification. The distribution-based logistics system will be evaluated on its velocity, accuracy, stock accessibility, and ability to meet deployment timelines and customer requirements.

Deployability

One of the basic principles of the Objective Force and Army Transformation is the ability to decide when and where to prosecute the fight. To do that, the Army must be able to shut down a crisis before it becomes unmanageable. This means that an extremely lethal force must be on the ground and ready to fight within hours—not the days, weeks, and months that it has taken to deploy forces in the past.

To meet the required deployment timelines, the Army must design units that can fight immediately on landing and sustain themselves in an austere environment until follow-on sustainment arrives. Identifying and accepting



austere support requirements—deploying with only absolutely essential capabilities—must become a cultural trait.

While continuing to design units that require only minimal support, the Army also must count on the other military services to provide assets needed to achieve strategic deployment timelines. Force-projection platform infrastructure—the deploying installations and the air and sea ports of embarkation and debarkation—must be able to accept and process the large volume of personnel and equipment that will be needed to prosecute whatever contingency arises.

Agility

U.S. forces must be able to transition rapidly with minimal adjustments, whether at the tactical, operational, or strategic level. The maneuver sustainment system must be designed for speed and agility from the national level to the using units. The Objective Force will be expected to move greater distances in shorter times with both efficient and essential sustainment to maintain maneuver force momentum. Critical to the agility concept will be the ability to execute split-base operations and tailor maneuver sustainment on the move. Maneuver sustainment elements must be able to deploy in modular task organizations and reach other organizations and their home stations for support. They also must perform the same en route planning and rehearsal as the maneuver elements.

Versatility

Versatility is the ability of Objective Force formations to dominate at any point on the spectrum of military operations. There are far-reaching doctrine, training, leader development, organization, materiel, and soldier (DTLOMS) implications for the maneuver sustainment community, because the conditions of commitment for future units (maneuver battalions and brigades) are likely to differ greatly from those of today. In particular, the Army must be vigilant to ensure that the Army of Excellence (Legacy Force), Force XXI, and the Interim and Objective Forces can deploy and fight together seamlessly. This creates significant challenges for the sustainers who must service all four forces, possibly simultaneously, in a joint, multinational environment. The ability to support digitized and nondigitized forces on an asymmetric battlefield will require increased emphasis on the tactics, techniques, and procedures needed to sustain multiconfigured forces.

Lethality

The essential elements of lethality will remain fires, maneuver, leadership, protection, and information. When deployed, every element in the warfighting formation must be able to generate combat power and contribute decisively to the fight. The force protection challenge facing sustainers will be complex, multidimensional, conven-

tional, and unconventional. Sustainment organizations must be capable of both lethal and nonlethal deterrence. A force protection capability must be built into sustainment commands to provide continuous security of scarce and critical assets.

Survivability

The security of sustainment assets will remain an overarching concern. The likelihood that operations will occur in complex, urban terrain is increasing. Survivability must be linked to an inherently offensive orientation. By seizing the initiative and seeing, understanding, and acting first, the Objective Force will enhance its own survivability.

Protecting lines of communication and nodes will be difficult, but it is critical to operational success. Airports and seaports located near supporting and supported units will be vulnerable at times. Access to the theater of operations through multiple, unimproved points of entry will be required. Sustainment units must be equipped with the latest night-vision devices, combat identification systems, armed escort platforms, mine-clearing resources, and armored cargo vehicle technology.

Sustainability

The Army is aggressively pursuing opportunities and technologies to reduce its logistics footprint and replenishment demand. The Objective Force will deploy fewer vehicles and leverage reach capabilities. The Objective Force sustainment organizations must be able to reach vertically, horizontally, and globally to order, receive, and issue the stocks needed to support the pace of maneuver. The sustainment system also must reduce redundant nodes, both physical and decisionmaking. Echelonment will not be practical in many scenarios, nor will it allow the response times necessary to support the future force. At the strategic and commander-in-chief levels, the Army prepositioning strategy must undergo reform. Army pre-positioned stocks afloat must be capable of responding more rapidly to a wider range of contingencies.

Workload sharing, resource prioritization, manning, and enabler modernization must be reexamined. All sustainment echelons must be contingency ready in the Objective Force. The various echelons of sustainment must coordinate with other services to satisfy critical shortfalls. Evolving concepts must allow for modular, tailorable units that provide the flexibility to move requirements and capabilities quickly, both vertically and horizontally, within echelons. This concept does not allow for the traditional methodology of handling and holding stocks at every echelon. The use of strategic-, unit-, and mission-configured loads will help reduce stocks and handling, which, in turn, will expedite resupply to the maneuver units.

Trainability

Trainability is central to all Objective Force capabilities. Training must ensure that soldiers and leaders employ their units' capabilities fully and execute the total sustainment potential across the full spectrum of conflict. The Objective Force must exploit training technologies and performance enhancements. There are far-reaching training implications that may impact Active and Reserve component capabilities. All segments of the Objective Force must be trained to operate as a cohesive unit; however, the challenges presented by full-spectrum training across all components and types of forces will be difficult to overcome. Objective Force organizations, materiel, and doctrinal solutions must be integrated into a force that can adapt to various training strategies and scenarios.

Changing Environments

The principles of responsiveness, deployability, agility, versatility, lethality, survivability, sustainability, and trainability come with their own issues that must be resolved. But how do these principles fit into the overall operational environment? How does the operational environment fit into Army Transformation, and how does it support the Joint and Army Visions?

The operational environment has changed. In the past, the Army has planned for a major theater of war or a major combat operation. However, a wide range of commitments have been made in the past decade: major theater of war, regional conflict, stability operations, humanitarian aid, disaster relief, and, most recently, homeland security.

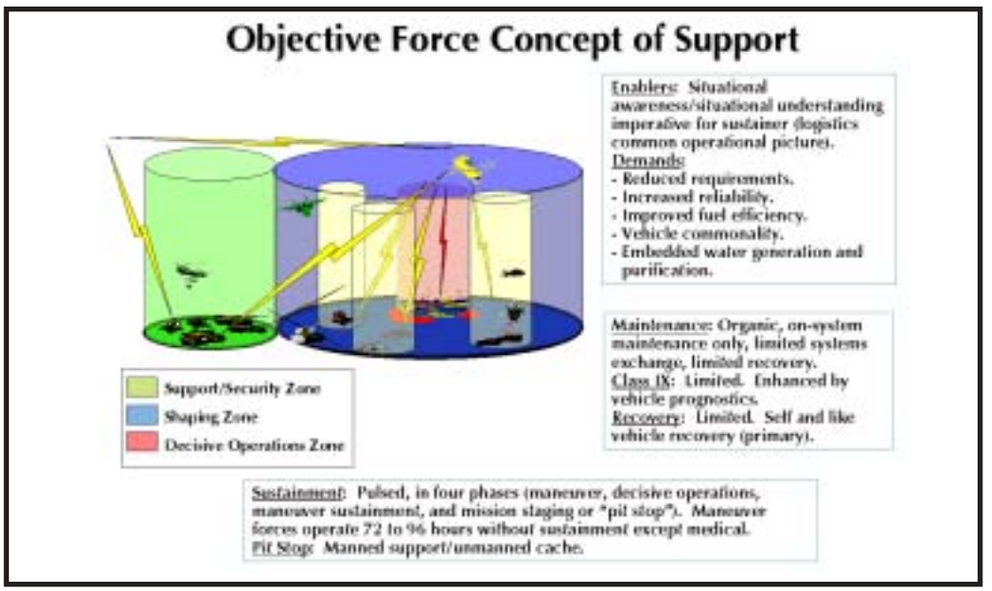
Physical environment is part of the challenge. The topography of a region often prescribes the nature of the conflict. In some regions, conflicts in complex or urban terrain degrade technological superiority. In other regions, an extremely limited or austere infrastructure affects the Army's ability to respond. Adding human issues and complex political relationships makes it even more difficult to program appropriate responses.

The military force that controls the time and tempo of the operational environment has more options to resolve conflicts. This makes the ability of U.S. forces to respond rapidly absolutely critical to their ability to deter conflict. Arriving in a region too late decreases the options of U.S. forces and their allies, and the costs can be severe.

The political environment, to include that created by the media, is another operational concern. It takes time and energy to build coalitions, and the intolerance for collateral damage caused by military operations is increasing.

Implementing the Doctrinal Framework

The Army Vision, articulated clearly by General Shinseki, is the enabling strategy to support Army Transformation. The Army will continue to increase its strategic responsiveness (deployability) while improving its ability to operate in a joint and combined environment. Leaders must be taught to understand joint warfighting and to integrate Active and Reserve component capabilities fully. The Army already has taken steps to ensure that its warfighting units are manned properly. At the same time,



it has provided for the well-being of soldiers and their families.

The strategic doctrinal framework that moves the Army forward on the road to a maneuver sustainment force modernization strategy is being coordinated closely to ensure that Joint and Army Visions are being promulgated to the planners and operational units.

An underlying challenge to implementing the doctrinal framework is the requirement to support Army of Excellence, Force XXI, Interim, and Objective Forces simultaneously. Each type of warfighting unit is unique, with differing sustainment concepts.

Within Legacy Forces, logistics support depends on the buildup of significant stockpiles of equipment and repair parts. The organizational structure supporting the Legacy Force is echeloned, with each level providing reinforcement support for the forward area, which results in multiple sustainment activities. In most cases, the maneuver sustainment capabilities are organic to the maneuver battalions, and organizational support is conducted through combat and field trains.

The Force XXI concept of support is the base for beginning maneuver sustainment transformation. Within Force XXI, the Army has bypassed some of the echelons of support and consolidated some maintenance capabilities. Doctrinally, Force XXI maneuver sustainment elements have been centralized in forward support battalions, base support companies, and forward support companies to free the maneuver elements to move and fight without accompanying logistics tails. However, in some instances, the maneuver battalions have maintained operational control of the forward support companies to provide additional flexibility and surge capability. Force XXI units also are the first "digitized" units. They have a situational understanding capability and a common operational picture of the battlefield. However, most sustainment still is provided on a daily basis, which involves some redundancy, and the units still maintain significant stockpiles of equipment and spare parts.

The interim brigade combat team (IBCT) takes another step along the evolutionary path to the Objective Force. Within the IBCT, the Army has eliminated echelons of support and backup capabilities and depends on external support from division and corps elements for surge requirements, while accepting the risk of nonsecure lines of communication.

In the IBCT, some revolutionary concepts have been identified for maneuver sustainment capabilities. Every-other-day resupply or resupply on an as-needed basis will replace the traditional daily delivery of supplies and other sustainment. Design considerations for new equipment also will call for greatly increased reliability, improved fuel efficiency, and greater commonality of vehicle chassis and repair parts in an effort to reduce the overall demand for sustainment.

The Objective Force concept of support is still a work in progress, but more revolutionary ideas are in the conceptual phase. Current considerations include removing all maneuver sustainment capabilities from the maneuver unit. All sustainment may be external to the unit through elements known as "expeditionary support forces" or some other title that denotes nonorganic capabilities. Design and operational considerations for this type of support are complex and center around developing habitual relationships between supporting and supported units. If current design considerations prove to be sound, maneuver sustainment capabilities will be truly modular and focused on task organization to execute operations in a wide range of scenarios.

Sustainment Management

Sustainment management is the centerpiece of the sus-

tainment "puzzle" (see chart above). It links the other four integrated maneuver sustainment functions—sustainment protection, sustainment projection, unit sustainment, and warrior sustainment—into one globally oriented sustainment management and provider system that has no functional boundaries. It is a key component of focused logistics.

Focused logistics is the fusion of information, logistics, and transportation technologies to provide rapid crisis response and sustainment directly to the warfighter. Sustainment management enables operational commanders and sustainment providers to see and anticipate losses, monitor supply consumption, and generate replenishment automatically to a predetermined level based on operating tempo and battlefield mission requirements. It enables the precise, anticipatory distribution of sustainment—the capability to provide the right commodity at the right place at the right time. A global Joint and Army-oriented system of embedded information management technologies is required to develop, implement, and execute an advanced, distribution-based sustainment management system that will integrate the supply chain fully from the national level to the tactical distribution manager and operational force.

Objective Force military operations require that sustainers become masters of supporting maneuver transitions from home station node to deployment node—from offense to defense and back to offense while transitioning from peacekeeping to warfighting and back again—all with minimal adjustments. This mastery of supporting maneuver transitions requires sustainment versatility and agility.

Emerging sustainment doctrine highlights the need for mission staging and sustainment replenishment. Mission staging is an intense, time-sensitive operation that includes all preparations that will ensure the success of an upcoming mission—planning, leading troops, rehearsing, training, reconstituting logistics support, configuring mission loads, tailoring for the next mission, and conducting reconnaissance, surveillance, and information operations. Sustainment replenishment will be a quick, in-stride operation that fits within the battle rhythm. It will be either a deliberate operation or a hasty operation as opportunities exist or circumstances require. Ultimately, future sustainment missions will be performed with the agility and tempo of maneuver operations while demonstrating the precision of providing the right support at the right place and time.

Undoubtedly, the Objective Force Army must become a reality to meet the Nation's future security needs. To remain relevant, the Army's Objective Force must be more rapidly deployable. At the same time, the Army must continue to operate competently and confidently in the midst of complex, risk-laden, and evolving global military and political environments. Full spectrum dominance in offensive and defensive operations, as well as in stability and support missions, requires a highly maneuverable, extremely agile, capabilities-based Army. Sustainment of the Objective Force will be complex, uncompromising, hazardous, and nonnegotiable. Operational success requires responses that will be both rapid and decisive to terminate crises at the outset or to place opponents at an early, continuing, and ultimately decisive disadvantage.

Larry L. Toler is chief of the Force Integration Division of the Directorate for Combat Developments for Quartermaster in the Army Combined Arms Support Command at Fort Lee, Virginia. He is a certified professional logistician and has a master's degree in business management from Florida Institute of Technology and a bachelor's degree in business administration from the University of Alabama.

Obstacles to CSS Transformation

by Major Gregory H. Graves

Trends observed in operations and exercises indicate areas in which the Army must change to achieve the Objective Force.

> Combat Service Support Transformation is essential to realization of the Objective Force concept. Logistics efficiencies are necessary to support the very challenging sustainment time/distance/volume/weight/physiology paradigm. The Combat Service Support Transformation will encompass both advanced capabilities and new logistical concepts.
>
> —*Concepts for the Objective Force*
> Army White Paper, 2001

Combat service support (CSS) transformation will require a paradigm shift: the warfighter must stop viewing CSS as a constraint and start seeing it as an enabler for strategic, operational, and tactical maneuver. To break the habit of viewing logistics support as a constraint, the Army must make fundamental changes in how it deploys and sustains the force.

Since the Gulf War, Army leaders at all levels have documented the results of many operations and exercises in an attempt to capture the lessons of experience for future leaders. That many of the trends observed over the last decade tend to recur indicates that many of these lessons have not been learned.

These trends serve as an excellent starting point for launching the changes necessary to transform CSS. They are drawn from observations documented by the Center for Army Lessons Learned, the Army War College, the Army Combined Arms Support Command (CASCOM), the Battle Command Training Program (BCTP), the combat training centers (CTCs), the Institute for National Strategic Studies, and the Association of the U.S. Army (AUSA). These trends can be considered according to the Army's six imperatives—doctrine, training, leader development, organizations, materiel, and soldiers. In this article, I focus on trends at or below division level, while including significant trends involving strategic assets.

Doctrine

Doctrine increasingly emphasizes the use of information to enhance the Army's ability to provide support efficiently and effectively.

Trend observed. *A lack of capability in communications and information systems in CSS organizations is a critical impediment to effective support.*

Tactical communications assets routinely have been provided in adequate amounts to combat units, while CSS organizations have been forced to manage with less. However, secure communications are as vital for CSS units as for maneuver elements. Communications proved to be woefully inadequate during the Gulf War. Support convoys there had no logistics radio net to monitor during emergencies. Other convoys lost contact less than 5 kilometers down the main supply route. The lack of communications also reduced the ability of smaller logistics elements to provide accurate updates to command and control centers so that logistics leaders could maintain situational awareness.

Improving logistics automated information systems is even more important than improving tactical communications capabilities. The bottom line is that logisticians need an automated system that integrates all functional areas and interfaces with joint systems. The current conglomeration of systems was developed independently by different proponents. Although some progress at systems integration has been made over the last decade, the situation has not improved dramatically.

During the Gulf War, there was no viable multi-

☐Commonality is a key feature of the new Stryker interim armored vehicle. It will come in 10 versions, including the infantry carrier vehicle (above) and the mobile gun system (right).

functional logistics automation. Comments from transportation, medical, and personnel organizations identified common problems. Automated systems needed better interfaces, more communications links, improved durability, and, in some cases, more hard-drive storage capacity. To meet urgent requirements, soldiers resorted to comfortable, simple manual systems. This fallback position reduced the accuracy and responsiveness required for effective support.

Impact on transformation. Lack of communications capability is partially the result of the supply-based logistics system from which the Army is transitioning. In this system, stockpiles are established in the theater, and transportation assets are committed without the need to redirect them en route to their destinations. In the Objective Force, we not only will be able to track supplies in real time all the way to the user but also to redirect them as the mission dictates. This capability is impossible with the current state of communications and information technology.

Training

Deficiencies in various areas of CSS training have been well documented through BCTP and CTC experiences. The major need in training results from the lack of communications capability.

Trend observed. *Logistics leaders possess inadequate situational awareness, which prevents anticipatory logistics support.*

A leader who lacks current situational awareness cannot anticipate future requirements effectively. The major impediments to logistics situational awareness, as described in several years of BCTP comments, are poor reporting and poor battle tracking, both of which may be addressed through training. Poor logistics status reporting from supported units hinders accurate forecasting and does not allow CSS units to fulfill support requirements. Reporting problems reach across CSS functions. Regardless of the specific CSS function, a lack of timely reporting results in missed decision points and forces logisticians to react.

Status reports from supported units are not the only

problem. Reporting within CSS units also is lacking. Logistics units do not maintain running estimates of stockage status. At the National Training Center at Fort Irwin, California, main support battalion (MSB) and forward support battalion supply companies have difficulty tracking on-hand supplies. Transportation units have difficulty maintaining accurate status of personnel and trucks on missions or available for missions at the company and battalion levels. During the Gulf War, MSBs and corps support battalions had as many as nine separate convoys on the road at one time with no current status report on them available. The inadequate information systems in place did not facilitate logistics reporting. Problems with communications among these systems made it difficult for units to keep accurate and timely maintenance status.

Reporting problems have contributed to, but do not entirely account for, poor CSS battle tracking. CSS leaders must employ better tracking systems within their command and control centers. Lessons learned from the Joint Readiness Training Center at Fort Polk, Louisiana, show that poor battle tracking reduces the ability of logistics leaders to forecast and position elements to provide responsive support. CSS leader decisions and unit movements are not based on tactical events and therefore do not permit effective support. Support operations officers at the CTCs often discover problems only after the opportunities to correct them have passed. Logisticians must track the battle and the accomplishment of logistics missions accurately to support the maneuver commander.

A predictable result of the deficiencies in battle tracking is that CSS operations have not been synchronized with the maneuver scheme. BCTP observations have shown that movement control and main supply route security often are not synchronized with the tactical operation. As a result of the lack of synchronized planning, resupply operations react to events and resupply windows often are missed. CSS operations and movements are not controlled properly or synchronized with supporting as well as supported units. This creates disconnected, ineffective support that does not respond adequately to mission needs.

Impact on transformation. *Concepts for the Objective Force* describes what will result from improving situational awareness and status reporting: "Improved situational understanding will enhance force protection and sustainment, allowing the force to preserve combat power for decisive outcomes at times and places of the commander's choosing." A continued lack of situational awareness will impede the responsiveness and versatility required of the Objective Force. More training is needed to improve status reporting and battle tracking.

Leader Development

Since leaders have the primary responsibility for documenting lessons learned, some of the issues recorded at the CTCs and BCTP inevitably focus on the process of growing future leaders and on moving leaders through developmental assignments.

Trend observed. *The combination of increased operational tempo and reduced force structure has impacted the professional development of CSS officers negatively.*

One area where this negative impact can be seen is in the career progression of junior officers. CSS lieutenants have been perceived as sharp and technically proficient. However, their career progression has been hindered by the absence of executive officer positions in most CSS companies. Combat arms leaders view that leadership opportunity as the best place for lieutenants to learn how to be company commanders. Most logistics units, however, have lost their authorizations for executive officers as a result of measures taken to reduce the size of the force.

Another area where the impact of doing more with less has been felt is in the reintegration training phase following operational deployments and CTC rotations. In the transition period following the Gulf War, units experienced leadership changes, rapid loss of personnel once the restriction on retirements and transfers was lifted, and shortages in low-density military occupational specialties because of competing personnel assignment priorities. Senior leaders had to move junior leaders into positions above their grades because they lacked a sufficient number of experienced replacements.

Similar issues surfaced in many locations after operational deployments and training rotations because commands retained officers past their expected tour lengths in order to keep the same team together for future deployments. While valuable experience was gained during operations and exercises, officers needed to move on to other positions and attend required professional development schools within a limited time to be qualified for promotion. The balance between unit and individual priorities must be managed more closely.

A final set of observations revolves around the issue of multifunctional logistics officers. The establishment of functional area (FA) 90, logistics, institutionalized the concept of multifunctional logisticians in the Army. However, more must be done to ensure that multifunctional logisticians have the breadth of expertise and training they need. Since the majority of FA 90 officers come from the traditional CSS branches (Quartermaster, Ordnance, and Transportation), expertise in medical support is lacking among FA 90 officers. The professional development system must address this deficiency.

Impact on transformation. The Objective Force will

be designed with organic combined arms units rather than with today's reliance on task organization. This means more junior leaders will be needed to operate outside the umbrella of a parent functional organization. This independence will require more confidence and expertise among junior logistics leaders—the very characteristics that are most affected by the trends observed in leader development.

Organizations

External factors impact how organizations are designed, employed, and resourced. This trend addresses external demand for the support that CSS organizations provide.

Trend observed. *The demand for logistics support is too great.*

Numerous observers have echoed this conclusion. For example, in his AUSA Landpower Essay, "A Century of Power Projection: 1898-1998," Dr. Charles R. Shrader asserts, "Although modern technology has resulted in more firepower in smaller packages, modern mechanized combat formations still consume enormous amounts of fuel and other supplies." As long as huge quantities of supplies are required to support the force, large numbers of logistics units will be required to manage and deliver those supplies. These logistics units also will require logistics support, so the cycle will continue.

The following observation from the CASCOM collection of lessons learned during the Gulf War provides a graphic illustration of this point—

> The COSCOM [corps support command], normally 8,000 strong, deployed to ODS [Operation Desert Storm] with 22,000 people. They can't help but spend a large portion of their time supporting themselves. We need to look at streamlining the COSCOM. Streamlining divisional support structures while adding to the COSCOM monolith goes against every lesson we should have learned from this conflict. COSCOMs are unwieldy. They have multiple layers that dilute any sense of urgency that technicians might have. They are traditionally so far geographically removed from their customers (increasingly farther in an offensive situation) that they can't be responsive to the needs of the front line soldier.

Current efforts to reduce the logistics footprint have begun to address this issue. Additional efforts, such as employing families of vehicles, will help to reduce the demand for supplies and thus drive down the required level of logistics support.

Impact on transformation. Without reducing the amount of sustainment required to support the force, the Army will be unable to achieve the reduction in the logistics footprint required by the Objective Force. The force will continue to require large numbers of CSS units and personnel, which, in turn, will drive up requirements for sustainment. This continuing cycle will prevent the Army from becoming the sustainable force that transformation requires.

Materiel

Two trends involve materiel. These trends concern the key CSS functions of fixing and moving.

First trend observed. *The Army as a whole needs to develop and exploit common-chassis vehicles with improved reliability.*

The organization trend notes that the current force requires an excessive amount of logistics support. Combat, combat support, and CSS organizations possess dissimilar equipment. An AUSA report, "Strategic Mobility & Responsive Power Projection," describes the Army fleet as "a complex inventory of multiple types of equipment, the sheer numbers of which drive up the stockage requirements for numerous lines of repair parts." Problems with reliability compound the magnitude of these stockage requirements by driving up demand. All branches of the Army need to modernize, purify, and standardize their vehicle fleets. As a case in point, in "Experiences in Division Command, 1993," a collection of lessons learned compiled from recent division commanders by the Army War College, one division commander noted that, from a maintenance standpoint, "One of the smartest things that was ever done was to pure fleet [standardize] the 5-ton trucks."

Other comments by division commanders following the Gulf War addressed the need for an off-road fueling capability that was not provided by 5,000-gallon tankers. Two commanders advocated replacing the tankers with heavy, expanded-mobility, tactical truck (HEMTT) fuelers. Doing so would have served two purposes. First, it would have provided a fueling capability about as mobile as the vehicles being supported. Second, it would have helped to standardize the trucks in the division, since many units already had cargo HEMTTs, which reduced the need for additional lines of repair parts. These two results are the key advantages of common-chassis vehicles.

Impact on transformation. Army leaders have taken this lesson to heart. The emergence of both the family of medium tactical vehicles and the variants of the infantry carrier vehicle in the interim brigade combat team (IBCT) is a great stride toward improving the supportability of the Objective Force. Great improvements in

equipment reliability also must be made in order to realize the sustainment concepts and footprint reduction needed for the Objective Force.

Second trend observed in the area of materiel. *The current force is not mobile enough.*

Several comments following the Gulf War focused on the lack of transportation capability within the CSS force structure. One primary area of concern was the shortage of heavy equipment transporters (HETs) experienced by the forces in theater. In "Experiences in Division Command, 1992," one former division commander went so far as to say, "I would put at least one battalion of HETs in each division . . . We don't have the ability to move about the battlefield." HETs were needed to move not only combat vehicles but also heavy engineer equipment.

Transportation deficiencies also were experienced in logistics units. The bulk petroleum-hauling capability was inadequate; attempts to use host nation support to make up the deficiency resulted in contaminated fuel because of a lack of standardized procedures. Also lacking was the capability to move the vast amount of repair parts required to support a division. In a 1991 CASCOM memorandum compiling lessons learned from the Gulf War, a division support command commander said, "If you can't make my ASL [authorized stockage list] 100% mobile, it's no good to me."

Impact on transformation. The superior mobility that the Objective Force must possess will apply to its logistics support as well as to its weapons platforms. The weapons platform issue is being addressed in the IBCT. Mobility of logistics support must be improved to allow responsive support to the highly mobile maneuver forces.

Soldiers

Soldiers are the Army's most valuable assets. To employ soldiers properly, the Army needs the right soldiers, properly equipped, in the right place at the right time.

Trend observed. *Reserve component CSS units must be integrated into the logistics system, adequately resourced, and modernized before they need to be mobilized.*

The Gulf War and Operation Joint Endeavor tested the Army's ability to activate and deploy many of its Reserve component units. However, many of the combat support and CSS forces were slow to activate and were delayed in deploying into the theater. Some deployed units had difficulty performing wartime missions; their readiness ratings did not reflect their capabilities accurately. Other units depended on their ability to correct their deficiencies after they arrived in the theater, when they really needed to be fully capable immediately on arrival. Some of the deficiencies were addressed by using contracted support in the theater, which precluded accurate tracking of demands in the logistics support system.

Most Reserve component units did not know who they would be supporting before they deployed, which created a huge integration problem in the maintenance arena. Since these units did not know who they would support, they could not determine what ASL items they should take with them. This created unnecessary, preventable delays in obtaining repair parts. Other units were not modernized to the same level as the units they supported.

Impact on transformation. The transformation of the Army is a total Army effort. If we do not ensure that Reserve component units are modernized to the same level as their active counterparts and that they are properly integrated with the units they will support, we will find ourselves with advanced warfighting platforms and an outdated support structure that is unable to provide the responsive support needed by the Objective Force.

The Objective Force concept calls for the Army to be able to conduct continuous combat operations in order to overwhelm the enemy's ability to respond. The capabilities required to support these operations are still being developed. *Concepts for the Objective Force* states, "Continuous operations will require innovative sustainment concepts and capabilities, based on sharp reductions in sustainment demand, significant improvements in reliability, split-based operations, and refined procedures for accelerated throughput, battlefield distribution, and mission staging." While obstacles currently exist that preclude the execution of this concept with today's force, the Army will overcome these obstacles as it has so many others throughout its history.

Major Gregory H. Graves is an operations research analyst in the Directorate of Combat Developments for Combat Service Support at the Army Combined Arms Support Command at Fort Lee, Virginia. He holds a B.S. degree in engineering management from the U.S. Military Academy and an M.S. degree in industrial engineering from Texas A&M University. He is a graduate of the Field Artillery Officer Basic Course, the Transportation Officer Advanced Course, and the Army Command and General Staff College.

Force Protection in the Future

by Major Timothy Norton

In the future, will it be necessary for the Army to train "combat service support warriors"? The author thinks the concept has merit.

Proposed changes in how future force structures (Force XXI, interim brigade combat teams [IBCTs], and the Objective Force) will be supported could mean that the Army will need to include equipment armed with serious defensive weaponry and soldiers trained to use it in its combat service support (CSS) units.

Results of the Army Transformation war game point to a future battlefield *twice as lethal* as the current one across the full spectrum of operations. According to observations from the National Training Center at Fort Irwin, California, "The skills and equipment necessary to fight in the BSA [brigade support area] and defend resupply convoys are inadequate even for today's conditions, let alone future operations." Considering the lethality of future combat operations, CSS units will re quire a quantum leap in tactical competence to survive and fulfill their wartime missions. In the future, will current CSS tactical doctrine and modification tables of organization and equipment suffice, or will it be necessary to develop true "CSS warriors"?

The Future

CSS units have always walked a fine line between mission and survival. Many doctrinal publications refer to the risks a CSS commander must take to provide support to a combat element. CSS units are primary targets for attacks ranging from terrorist actions to all-out exploitation by enemy forces. Typically, attacking forces try to disrupt supply distribution systems, destroy command posts, and degrade the capability of CSS units to support tactical operations.

In the future combat scenario, support must be flexible, mobile, and agile to keep pace with maneuver elements. Logistics units will be everywhere on an ever-changing battlefield to support the combat soldier. Logisticians cannot count on staying in the rear because there will be no "rear," only temporary staging areas operating within the increasingly fast-paced and lethal combat zone. With the expansion of areas of responsibility into huge geographical areas (estimated to be 200 by 150 kilometers) in both Force XXI and the IBCT or interim division, those units with doctrinal security missions, such as military police, could be overburdened trying to provide route and security support. Logisticians simply cannot count on this support. This is particularly important now that we consistently are operating convoys from the corps area through the brigade rear boundary. If lethality is doubled, a unit or convoy will have a difficult time surviving the first 10 minutes of contact, let alone the 30 or more minutes it could take for help to arrive. It is easy to envision entire convoys becoming smoldering hulks while awaiting help from a military police or combat unit performing route or area security operations.

The Many Faces of Threat

Threats come in many shapes, sizes, and configurations. This will not change in the future. Current doctrine prescribes principles for self-protection, such as base defense and base cluster defense. This doctrine was written mainly for a linear, contiguous battlefield, which is no longer typical in most current operations.

The enemy's mission in a rear or support area is to delay the delivery of supplies or destroy them altogether. Any level of threat can disrupt support operations if the enemy has a target and a belief that his action will further his cause. Such threats could be deterred or repulsed quicker, easier, and at much less risk to the troops involved by the presence of armor or other combat vehicles in or very near the logistics units. If CSS units could defend themselves better, combat and combat support troops would be free to concentrate on their original mission—to win the war or keep the peace. With optimal equipment, CSS units would need very little assistance, if any, to combat threats.

The bottom line is that nearly all enemy operations in the rear area take place because CSS units and convoys are high-value targets and are essential for maintaining combat power to the maneuver units.

Throughput and Distribution

Throughput and distribution-based logistics are terms that come up in most discussions of Force XXI, IBCT, or Objective Force logistics. In the future, logistics func-

tions will depend on these concepts in one way or another. Distribution-based logistics replaces the supply-based system of Army of Excellence doctrine. Key changes include—

- Division and corps stockpiles are limited, to be replaced by velocity and control of delivery.
- Echelons-above-division (EAD) units resupply the division support battalion and forward support battalions, often as far forward as the forward support company.
- Divisions depend on EAD units to deliver supplies for the next day's operation.
- EAD units must adapt to a moving maneuver box and rapidly changing delivery locations.

These changes mean a very different CSS concept of support than we have today. This new CSS concept will cause a significant change in the doctrine, training, leader development, organization, materiel, and soldier systems (DTLOMS) associated with the CSS units involved in the Army's transformation.

Implications for EAD in support of the redesigned division are numerous and far reaching. Terrain restrictions, length of lines of communication, and the expanded battlespace of Force XXI and interim division units all will place greater demands on logistics planners and operators to accomplish support missions. Concepts of support using mobile corps forward logistics assets most likely will be necessary to ensure continuity of support. These same battlespace and logistics realities will increase security requirements for Force XXI and interim division CSS units. The CSS community must have the organic capability to provide force protection for assets moving around the battlefield, especially direct support units. Without the "correct" vehicles and weapons to defend themselves, CSS units will not assist in the fight—they will be a detriment to the fight instead.

Battlespace

The extended battlespace of Force XXI and the interim division will lengthen lines of communication, which will make it more difficult to keep them secure. This will only compound the problems faced by distribution-based logistics. To help overcome the distance factors, CSS convoys must gain and maintain the same situational awareness that the combat forces have by using enablers. This is especially critical forward of the division rear boundary.

While operating in a Force XXI or interim division environment, security of CSS elements will depend heavily on situational awareness computer and communication systems such as the Force XXI Battle Command Brigade and Below System, the Combat Service Support Control System, and the Movement Tracking System (MTS). With such situational awareness assets, it is possible to "see" the enemy and friendly forces alike and make adjustments as required. Situational awareness will give the CSS commander the ability to influence the movement of his troops and equipment and to use them efficiently, effectively, and safely.

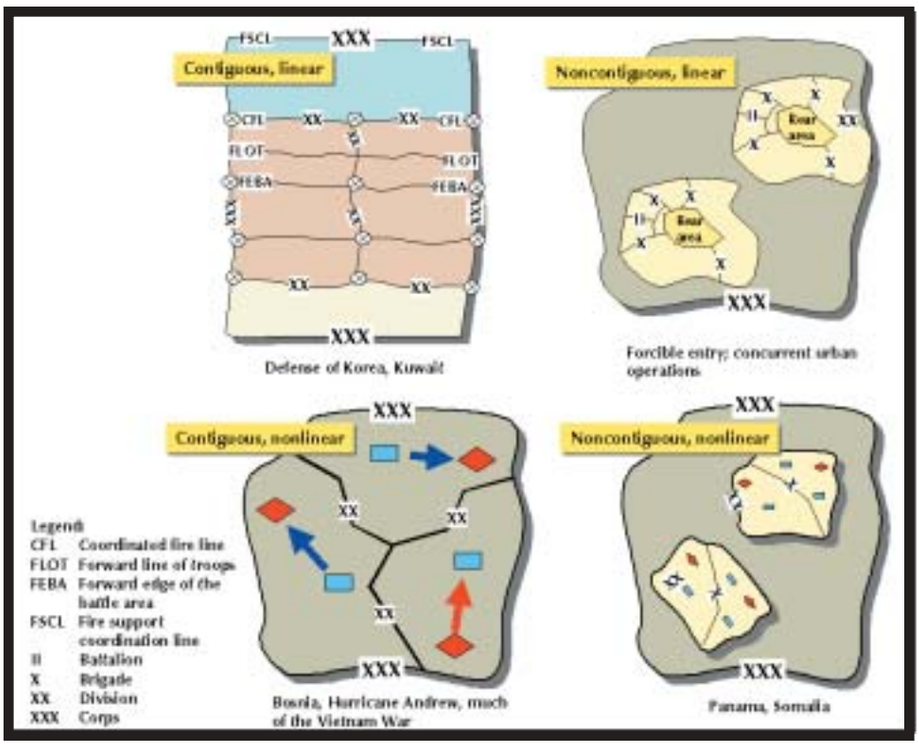
Split-Based Operations

A force-protection screen also must be maintained in split-based operations if combat and CSS units are to conduct their operations successfully. Forward-deployed and forward-employed units, forces at seaports and airports of debarkation, and units in the BSA must have the ability to provide force protection in split-based operations. For CSS units, this operational reality adds to the dilemma of having security forces spread too thinly across a huge area of responsibility. It also further stretches the organic defensive capabilities of units that already are stretched to the breaking point.

Imagine a logistics element made up of slices from several units traveling 50 or even 100 kilometers from their current positions and setting up a logistics base in the middle of nowhere. (The chart on page 14, taken from Field Manual 3–0, Operations, is an example of this situation.) The logistics element alone must defend the base because the maneuver unit, which has its own mission to accomplish, is nowhere near the base. Without adequate defensive equipment, the base could become a wasteland in minutes. Also, applying the concept of "just right" logistics while operating in an austere CSS environment could mean that a single lost convoy or shipment of supplies literally could stop an entire maneuver operation in its tracks. The criticality of CSS cannot be overstated. If operations are conducted as envisioned in Force XXI and interim division briefings, there will be very little room for error. Simply stated, if CSS units fail to show up, the maneuver units will not get what they need.

Within the battlespace, asymmetric factors also affect operations. Asymmetric warfare seeks to avoid the opponent's strengths and to pit comparative advantages against relative weaknesses. This, coupled with the issue of contiguous and noncontiguous areas of responsibility, especially in small and mid-size contingencies, can be significant.

Because asymmetric attacks pose problems to all combatants, the disadvantaged side must consider asymmetry from the start so it can adjust its course of action, doctrine, methods, and equipment requirements. Since the U.S. Army historically has been the superior force, enemy forces will have to change their methods if they expect to gain any real advantages over it. This has been demonstrated in every Army deployment since Operation Desert Storm. The enemy has used asymmetrical, unconventional warfare to negate technological and personnel advantages. When direct combat is not an op-



☐ Example combinations of contiguous and noncontiguous areas of operations and linear and nonlinear operations.

tion, bombings, sniper attacks, and assassinations become the disadvantaged side's course of action. Putting a combat vehicle in every convoy and at every logistics base would deter or lessen the effects of these tactics with firepower and protected maneuver.

Equipment

In its 2000 White Paper for Force XXI, the Army Combined Arms Support Command (CASCOM) declared, "Transportation units must have enhanced survivability and communications with each other, customers, and distribution managers." This statement expresses very clearly the need for CSS units to have an assured communications capability that includes radios, the Combat Service Support Control System, and the MTS. With the MTS, headquarters units can redirect supplies, avoid problem areas, and improve the effectiveness of the supply and distribution systems. According to the CASCOM White Paper, "Truck companies need to be more heavily armed with MK–19s to provide convoy security . . ., so the basis of allocation for weapons must increase." Indeed, more firepower is required in CSS units. However, arming alone is not enough. If a vehicle is not designed to accommodate a heavy weapon or to shoot, move, and communicate, it cannot do its job in a firefight. For example, petroleum tankers should not have weapons firing from them, nor should other CSS vehicles serve as platforms for ring-mounted heavy weapons firing. Even hardening existing vehicles is not practical because of the nature of those vehicles and their intended purpose.

The answer could be as simple as equipping and manning CSS units to succeed in the future battlefield environment. This could be accomplished by placing a vehicle such as the interim armored vehicle or its equivalent in CSS units. That may be controversial, but it has merit because "no supplies means no shooting, moving, or communicating" for the maneuver elements. Without pushed supplies, combat and combat support troops will run out of fuel and ammunition and will surely "wither on the vine."

Future CSS concepts include more direct support to a division by EAD than ever before. They also call for the divisional CSS units to do more, with less, and in more locations than ever before. For the Army to be successful, it is essential that CSS units keep pace with force structure enablers. Future Army forces must be properly manned, equipped, and trained if they are expected to fulfill our Nation's needs while bringing back alive as many troops as possible. **ALOG**

Major Timothy Norton is the commandant of the Regional Training Site-Maintenance at Fort McCoy, Wisconsin. He has a master's degree in management from Silver Lake College in Wisconsin and is a graduate of the Ordnance Officer Basic and Advanced Courses, the Combined Arms and Services Staff School, and the Army Logistics Management College's Logistics Executive Development Course, for which he completed this article.

Energy Independence: Using Rechargeable Batteries in the Future Battlespace

by Thomas J. Nycz

Field units throughout the Army can achieve significant savings by using rechargeable batteries whenever possible during training and real-world deployments.

Batteries are a critical element of many portable military systems, such as communications sets, night-vision devices, and sensors for training and combat. Without power, these systems simply are not viable. For this reason, managing the Army's battery program is significant, challenging, and rewarding.

During the 1970s and 1980s, there were over 350 different types of batteries (1.5 to 30 volts) in use by the Army and Marine Corps. The proliferation of battery types, shapes, and sizes, coupled with increasing demands for portable power, led to historically high annual battery expenditures of $100 million or more, decreased unit readiness and interoperability, and reduced the industrial base.

A few years ago, the Chief of Staff of the Army, General Dennis J. Reimer, challenged the Army to provide vehicle batteries that would last 5 years or longer and to reduce Army battery sales by 50 percent. The Army Communications-Electronics Command (CECOM) responded in two important ways.

Battery Initiatives

First, the Power Sources Center of Excellence (PSCOE) was established to bring together developers of all the technologies in the power sources arena and other defense services and agencies and the actual users of those technologies. The main objective of the PSCOE is to ensure that the Army gets the most power-efficient solutions with the least weight and at the least cost to meet the power requirements of today and the ever-increasing demands of the digital battlefield of the future.

Second, CECOM convinced the Chief of Staff that, by introducing a new family of communications-electronics rechargeable batteries and a smart, inexpensive charger, battery costs during training could be cut by as much as 60 percent over a 3-year period for an average battalion. This decision was not an easy one for the Chief of Staff of the Army or the logistics community because the use of rechargeable batteries instead of primary, disposable batteries is a very cost and culturally sensitive issue. The policy of "train as you fight" presents a marketing challenge to "sell" the benefits of using rechargeable batteries to leaders, field commanders, and the units actually using a myriad of portable equipment.

The decision to use rechargeable batteries for training was not easy, but it was certainly the right one. In 1997, the Army invested $9.1 million to jump-start the rechargeable battery program. So far, that investment has saved the Army over $30 million. CECOM continues to push this concept even further. The benefits of using rechargeable batteries throughout the Army include significant cost savings, safer use and disposal, and uninterrupted operations if logistics and supply trains are severed or delayed. Rechargeable batteries provide field units with "energy independence" while leveraging industry improvements in commercial cell designs and applications.

The usual concerns of rechargeable battery use, such as higher weight, initial cost, charging requirements, and acceptance by the field, have been overcome to a great extent by demonstrating the batteries' clear advantages. The commonly assumed negatives, such as undue manpower required to charge batteries and short operational run times on equipment, have been dispelled. The Army

has taken advantage of industry developments such as improved battery chemistries and large-volume manufacturing. These improvements have been validated through actual field use and through significant marketing and support by CECOM personnel, who also have made battery information available on the CECOM Web site and in literature such as *PS Magazine*. There are still applications better suited for primary (nonrechargeable) batteries, such as Special Operations Forces and cold climate missions, so there always will be a need for better primary batteries.

The bottom line is that using rechargeable batteries, especially for communications and electronics equipment, saves tremendous operation and support dollars. The Army spends over $35 million annually on disposable batteries for equipment such as radios, sensors, and night-vision devices. That figure will grow as the digital battlespace expands and programs such as Land Warrior are fielded. A CECOM study, validated by the Army Audit Agency, demonstrated that the average battalion could reduce its expenditures for primary batteries by 66 percent over a 3-year period by using rechargeables for training. The study took into account the dollar amount invested in the batteries and chargers in the first year. Rechargeable batteries and chargers are being used successfully by a number of units in Kosovo and Bosnia. One battalion determined that it saved over $600,000 in a 6-month period by using rechargeable batteries and chargers instead of disposable primary batteries. Field units throughout the Army can achieve significant savings by increasing the use of rechargeable batteries whenever possible during training and real-world deployments.

Batteries for Combat Use

The Department of the Army policy mandating the use of rechargeable batteries for training may be expanded to include combat use also. The latest Army Acquisition Executive policy, dated January 2000, requires project managers to field new systems with rechargeable batteries by October 2002. CECOM has tested and analyzed field charging with actual units in different locations. All of the testing and evaluations demonstrated the savings potential and importance of fielding the batteries and chargers throughout the military services.

To facilitate the use of rechargeable batteries in tactical applications, CECOM fielded a universal battery charger along with the newest family of rechargeable batteries. A charger-on-the-move, which is a vehicle-mounted system, was also developed. The newest lithium ion battery systems, which are lighter than the former nickel-metal hydride systems, are capable of storing more energy than ever before and can be charged over 500 times. Later this year, CECOM will be introducing new versions of the BB–390 battery (used in Single-Channel Ground and Airborne Radio Systems [SINCGARS] and over 60 other types of equipment)

☐ To facilitate the use of rechargeable batteries in tactical applications, CECOM developed a universal battery charger (left), a charger-on-the-move (center), and a new family of rechargeable batteries (right).

☐ **Batteries are a critical element of many military systems, such as Land Warrior.**

and the BB–2600 battery (used in Global Positioning System [GPS] receivers and precision lightweight GPS receivers).

"Smart" cables that can charge a battery from any 12- to 24-volt direct-current power source also are being acquired. The goal is to move the battery-charging capability as far forward as possible and to make the effort as simple as possible for the user. Other devices, such as thermophotovoltaics (which convert electromagnetic radiation from thermal sources to electricity), zinc-air batteries, solar panels, and fuel cells, are being designed and tested. These devices will be fielded in the next 2 to 5 years to enhance forward charging capability as well as their use in remote sensors. The use of a combination of primary and rechargeable batteries, chargers, and reusable energy-collection devices will provide units with portable power and allow them to conduct missions wherever they are needed without critical reliance on logistics trains.

Power Management

Another initiative that will make the use of rechargeables even more viable is power management. CECOM is making power management a priority requirement with materiel developers in an attempt to reduce the power demands of new equipment. Mission time, customer satisfaction, and extended battery life go together. Since military communications and electronics equipment requires significant power to operate, any potential for reducing the power consumption is critical. Designers and manufacturers are being tasked formally in contracts to save as much power as possible. Every facet of design, including system architecture and software and design features such as sleep modes, are being analyzed and emphasized, especially for portable equipment such as radios and night-vision devices. If the military can achieve gains similar to those that industry has realized (such as improved battery chemistries and large-volume manufacturing), the resulting savings in battery expenditures will be significant.

Power management within the Land Warrior system is the key to reducing total energy needs. Following industry's lead in the cell phone and personal data assistant market, designers benefit from paying attention to power usage from the very beginning.

CECOM will continue to provide batteries for Army, Marine Corps, Navy, Air Force, and foreign military sales customers while continuing to push the development and use of portable power technology. Its efforts will be guided by what testing and evaluation have indicated so far—

- The digital battlefield will continue to drive up demands for portable power.
- Rechargeable batteries will continue to improve in performance, deliver more energy, and take advantage of industry-driven advances.
- Using rechargeable batteries saves big dollars in training and gives fighting units energy independence.
- Advances in battery technology and other energy devices such as fuel cells will continue and allow units to conduct extended missions.
- Applying power management design techniques reduces battery usage and improves operating efficiency of military systems such as Land Warrior.

While the challenges are many, developers at CECOM take pride in supporting their customers—the warfighters. For more information on battery programs, including the rechargeables program, visit the CECOM Web site, www.monmouth.army.mil/cecom/lrc/lrchq/power.html. **ALOG**

Thomas J. Nycz is the chief of the Integrated Power Management Office of the Logistics and Readiness Center at the Army Communications-Electronics Command at Fort Monmouth, New Jersey. He is a supervisory electronics engineer with a master's degree in management science from Fairleigh Dickinson University in New Jersey. He is a member of the Army Acquisition Corps and has 33 years of Federal service.

AMC Warfighter Exercise 2001

by Michael L. Noll

AWFE ’01 cemented a habitual professional relationship between the Army Materiel Command and the supported commands in Korea.

Army Materiel Command (AMC) Warfighter Exercise 2001 (AWFE ’01) demonstrated AMC’s ability to support today’s warfighter. The exercise was conducted last August in conjunction with Ulchi Focus Lens 2001 (UFL ’01) in South Korea. During the exercise, AMC manned its wartime positions in direct support of the 19th Theater Support Command (TSC), which provides robust logistics support to the Eighth U.S. Army operating on the Korean peninsula. The execution of an integrated AWFE ’01 and UFL ’01 oriented command and staff personnel in the Korean theater about AMC’s worldwide mission capabilities and trained them on AMC procedures for providing timely and adequate wartime support in Korea.

History of AMC Warfighter Exercises

In 1999, a computer-assisted tabletop simulation warfighter exercise was held at the Army War College at Carlisle Barracks, Pennsylvania, to evaluate the Logistics Civil Augmentation Program (LOGCAP). Although missions in the Balkans, South America, Southwest Asia, and Africa had tested LOGCAP in real-world contingency operations, the need remained for appraising procedures and mentoring personnel in a controlled environment.

The exercise used a crisis scenario based in a fictional sub-Saharan African nation as a forum for doctrinal assessment and training for some 150 Army military and civilian personnel. Participants came from the AMC Program Management Office, LOGCAP; the Army Corps of Engineers; the Defense Contract Management Agency; the Army Reserve; various U.S. commands and agencies worldwide; and the Australian, Canadian, and New Zealand Armed Forces. The exercise concluded with an after-action general-officer review, chaired by the commanding general of AMC, the LOGCAP sponsor. At this briefing, the general decided that the highly successful training regimen demonstrated during LOGCAP Warfighter Exercise 1999 could be improved by annual AMC participation in the more sophisticated global unified command commander-in-chief-level exercises, beginning in 2000.

The unprecedented success of the first exercise resulted in institution of the AMC Warfighter Exercise as an annual event. Still centering on LOGCAP, AWFE ’00 expanded to include support of an actual Army service component commander and a major theater of war operation plan. AWFE ’00 was hosted jointly by Headquarters, Army Central Command (ARCENT), Third U.S. Army, Fort McPherson, Georgia; and Headquarters, 377th Theater Support Command, in New Orleans, Louisiana. AWFE ’00 was incorporated into the ARCENT Lucky Warrior Command Post Exercise, and participants exercised LOGCAP capabilities and procedures in support of a classified Southwest Asia major theater of war operation plan.

Building on the achievements of the first two warfighter exercises, the AMC commanding general again expanded the scope of the exercise to embrace all logistics elements in AMC. Thus the LOGCAP Warfighter evolved into an overall annual AMC Warfighter Exercise, with LOGCAP as one of many AMC functional support components.

Following the inclusion of AWFE ’00 in the ARCENT Lucky Warrior ’00 Command Post Exercise, the AMC G4 directed planners to expand AWFE ’01 from command post exercise simulations to support of a larger field training exercise (FTX). AMC personnel would

☐ The command and control center's access-control tent (left), operations tent (bottom left), and communications vehicle (below).

deploy to the site of notional hostilities to coordinate with actual in-country units that may request AMC support in a future crisis. Because including AWFE in a preexisting exercise had worked so well in 2000, it would be included in 2001 in a more complex combined and joint simulation. It was decided that the focus of AWFE '01 would be support of the Eighth U.S. Army during UFL '01, the largest annual U.S. military exercise held on the Korean peninsula, which was scheduled for August. UFL is a computer-based simulation involving U.S. personnel who are stationed in the Republic of Korea to perform peacekeeping duties in support of the 1953 armistice that ended the Korean War. UFL gamers, controllers, and supporting software tools permit the synchronization of complex player input on the actions of ground, naval, and air forces.

Planning for the combined exercise began in January 2001. The benefits of playing AWFE '01 simultaneously with UFL '01 would further enhance the simulation's depiction of real-world requirements that involved a broad spectrum of AMC customers and providers, including LOGCAP.

The association of AWFE with UFL more than doubled exercise participation from the previous year. The participants included personnel from AMC Forward-Far East in Korea; Headquarters, AMC; AMC major subordinate commands (MSCs) within the continental United States (CONUS); the Army Corps of Engineers in Korea; and the offices of the G3 and G4 at Headquarters, Department of the Army. Participants ranged from Active and Reserve component military personnel to Department of the Army civilians and contractors. AWFE '01 trained its participants through scenario events related to the UFL warfighting script and other

"off-line" requirements that were generated from the larger UFL host simulations and player interactions.

AWFE '01 Expectations

In the planning stage, AMC coordinated with UFL participants to ensure that AWFE '01 would enhance, rather than detract from, UFL play. One of the key coordination stops was with the commanding general of the 9th TSC, Major General Barry D. Bates. At in-progress reviews and other briefings, General Bates became increasingly enthusiastic about the logistics support that AMC planned to bring to the Korean theater for the 19th TSC's major theater of war mission.

To position themselves for the exercise, AMC personnel, complete with battledress uniforms, deployed to Camp Henry in Taegu with the 19th TSC. For the first time since its inception, AMC Forward-Far East stood up a command and control center that included much of its own communications equipment. With this setup, AMC could consolidate all AMC exercise support operations at one location instead of having to spread its operations among liaison positions at Camp Henry and at several other sites on the peninsula. The command and control center was established along the first base line of the Camp Henry Victory Field baseball diamond. Encircled with concertina wire, the site comprised an access control tent, an operations tent, and a communications vehicle.

☐ **The collapsible 2.4-meter satellite dish used with the Multimedia Communications System.**

Command and Control

AWFE '01 was the first time AMC, as a whole, exercised as it would organize and fight with the 19th TSC in a war. During wartime, AMC Forward-Far East comes under the operational control of the 19th TSC in direct support of the Eighth U.S. Army. In keeping with its "train as we fight" directive, AMC Forward-Far East then transforms into the Logistics Support Element-Far East (LSE–FE). This element is responsible for coordinating all of AMC's logistics support within the theater to respond to 19th TSC warfighting requirements, including any necessary augmentation from CONUS of AMC capabilities.

AMC and its MSCs provide logistics support for the Army worldwide. Rather than the warfighter having to know which AMC MSC performs a certain mission or provides a certain class of supply, 19th TSC support operations worked during the exercise with LSE–FE liaisons, who passed peninsula requirements to the AMC Operations Support Command (OSC) Emergency Operations Center (EOC) in Rock Island, Illinois.

The role of the OSC EOC was to provide one "AMC face forward" for the warfighter. Through the LSE–FE, the OSC EOC tapped into the vast support resources of all of the AMC MSCs in CONUS to provide offshore support for the Korea warfight. The OSC EOC continued to work with the AMC MSCs until the logistics requirements were met. Each MSC stood ready to provide reach-back logistics support from CONUS to the 19th TSC and Eighth U.S. Army. In-country subject matter experts from AMC MSCs deployed to Korea to provide logistics support during the armistice, along with their MSC counterparts in CONUS, added to the robustness of AMC's support of the 19th TSC and Eighth U.S. Army throughout the exercise.

Communications

The LSE–FE command and control center maintained continuous communication with the 19th TSC; Eighth U.S. Army; AMC Headquarters in Virginia; and the MSCs in Alabama, Illinois, Massachusetts, Michigan, and New Jersey. These communications systems used a combination of terrestrial hardwire and a mobile satellite uplink unit known as the AMC "fly-away package." This combined package, called a Multimedia Communications System (MMCS), was provided by the AMC Communications-Electronics Command. It consisted of a high-mobility, multipurpose wheeled vehicle (HMMWV) containing the communications equipment, a briefcase-shaped tactical video-teleconferencing (VTC) unit, and a 2.4-meter satellite dish. Highly mobile, the entire system can be operational within 1 hour after arrival at a site and packed up in 30 minutes. Most of that time is spent construct-

ing or dismantling the collapsible dish.

Packed with electronics, the MMCS can support up to 100 telephonic and 350 Internet connections. Through the Internet, the MMCS can provide real-time data, voice, and VTC capabilities to any place in the world that has an Internet protocol address.

Although commercial power was used for AWFE '01, the system also was configured for generator support, which provided internal equipment with an uninterrupted power supply. If separated from an external power supply, the system could continue to function for up to half an hour by self-generation.

Inside the command and control center operations tent, the VTC unit sat open on a table with a monitor, microphone, and digital camera affixed to the inside of the case lid. Throughout the exercise, the system provided reliable voice and video contact with logistics commands in CONUS and throughout Korea. This command and control center communications capability was used internally to train AWFE '01 participants, as well as to provide a broad range of logistics information to the supported UFL '01 forces.

Execution

During the UFL '01 exercise, the controllers in the Korean Battle Simulation Center inserted tasks from the master scenario event list (MSEL) at prearranged times. The 19th TSC battle captains responded to the taskings by designating the appropriate staffs to take action. As part of the 19th TSC battle staff, the AMC LSE–FE liaison officers passed the 19th TSC support requirements to the team chief in the LSE–FE command and control center. The control center then coordinated incoming issues, tasks, and requests for information and mobilized AMC elements to meet the warfighters' needs. To keep abreast of these requirements and exercise developments, AMC LSE–FE representatives participated in the daily updates by the commanding general of the 19th TSC and the shift-change briefings in the 19th TSC battle staff bunker.

During the UFL '01 exercise, AMC was able to insert separate events from the MSEL that were within the context of AWFE '01 but were not part of UFL. These events exercised and trained other elements of AMC that would not have been exercised by UFL only. AWFE '01 event play followed the same battle rhythm of UFL '01, except that the results of the play remained within AMC. These events allowed AMC to test operational procedures, review operational plans, and train commands and their staffs. These internal AMC training events centered on command, control, communications, and integration of logistics support among AMC Headquarters, AMC LSE–FE, OSC, and the other MSCs. Since the 19th TSC was able to observe the AWFE '01 internal play and training, the 19th TSC gained more insight about how AMC LSE–FE responds to logistics requests and other issues.

During the exercise, the 19th TSC learned that AMC is capable of more than they originally thought. "Play was truly excellent," said Lieutenant Colonel Sherry Holiday, Chief of the Plans and Exercise Branch, Eighth U.S. Army . "Players have learned a lot about [AMC] capabilities and functionalities. . . . We ought to do [this] every year."

At the conclusion of the exercise, General Bates said he was pleased with the training opportunity that his command had experienced with AMC. For the first time, AMC and the 19th TSC had worked together as a team to support warfighters. Both the AMC and 19th TSC staffs walked away with a more thorough understanding of their mutual support relationships and capabilities that had been demonstrated in the integrated exercise. Everyone benefited from the positive and constructive dialogs that had occurred among all participants.

Without qualification, AWFE '01 was a resounding success. AMC confirmed that its organizations, both on and off the Korean peninsula, provide substantial support to the theater, while warfighters in Korea learned more about the enhanced capabilities of the Army's premier logistics provider. A habitual professional relationship between AMC and the supported commands in Korea has been cemented and will keep improving by continuing the "train as we fight" mindset in realistic wartime environments. The unprecedented integrated exercise in 2001 will serve as the standard-setting baseline for future AMC Warfighter Exercises. **ALOG**

Michael L. Noll is the acting program manager of the Army Materiel Command (AMC) Logistics Civil Augmentation Program (LOGCAP). A retired Army Reserve colonel, he oversees the development, maintenance, and exercise of numerous LOGCAP support plans worldwide. He was the executive agent for the integrated Ulchi Focus Lens/AMC Warfighter Exercise 2001 and has conducted LOGCAP contingency support operations in East Timor, Haiti, the Balkans, South America, and Central and Southwest Asia.

Logistics Down Under

by Major Sandra L. Vann-Olejasz

At the U.S. Military Academy (USMA) in West Point, New York, research has always served as a valuable learning tool for cadets as well as a means of professional development for the faculty. Cadet and faculty research projects also have provided Department of Defense agencies with outstanding analyses in many areas. Therefore, West Point's Department of Systems Engineering has incorporated real-world experiences heavily into its curriculum.

One of the department's current research efforts focuses on developing a decision support tool to assist commanders and planners in making decisions on base camp locations and facility layouts. To gather research material, Cadets First Class Jon Hall and Tara Kitzman, engineering management majors enrolled in USMA's Advanced Individual Academic Development Program, traveled to Canberra, Australia, last summer to work with the cadets and faculty at the Australian Defence Force Academy. During their internship in Australia, Hall and Kitzman participated in a training exercise that centered on site and layout considerations for an Australian Army combat service support battalion (CSSB). The two cadets directed their efforts toward comparing Australian Army doctrine on setting up a CSSB to U.S. Army doctrine on setting up a forward support battalion (FSB).

Australian Army Organization

The Australian Army consists of approximately 30,000 soldiers. They organize, deploy, and fight primarily as brigades. As such, they do not have the multiechelon support structure of the U.S. Army. So a primary logistics consideration for the Australian brigades is how they will link to their own home station support structures or those of their allies.

The makeup of the Australian Army's CSSB is very similar to that of the U.S. Army's FSB. The CSSB consists of a headquarters element, a transport squadron, a health company (with medical and dental assets), a field supply company, and a field workshop. The main difference in the makeup and mission of brigade-level support is that the U.S. Army maintains transportation assets at the main support battalion, while the Australian Army's transport capabilities reside in the CSSB.

'PEACHS' Process

The process used to determine the site for the CSSB in many ways resembles the process of locating the FSB. The Australians use the acronym "PEACHS" to ensure that high-priority siting requirements are met. This acronym covers most of the elements that the U.S. military also considers essential.

The first letter of the acronym stands for protection. During the training exercise, Australian logistics branch captains first determined if their current site was suitable to sustain protection against the enemy and selected the optimal location for their machinegun nests. Similarly, U.S. doctrine states that protection is a primary consideration when choosing a unit's site.

The letter "E" in PEACHS stands for existing tracks. The Australians look for locations with access to road networks that will accommodate their transportation assets. Similarly, U.S. Army doctrine states that the FSB location should include roads that can accommodate vehicles.

The next letter in the acronym, "A," stands for access to the main supply route, which both the Australians and Americans consider critical in providing support.

The letter "C" stands for camouflage and concealment, which is the same as the U.S. Army term "cover and concealment."

The "H" in PEACHS represents hardstanding. Hardstanding means that the ground at the location must be able to withstand heavy trucks and changes in weather. During the training exercise, the Australian captains determined if the ground could sustain heavy vehicles in the harshest weather.

The last letter of the acronym, "S," stands for space, which refers to the potential for expansion. Both the Australians and the Americans may find it necessary to expand the existing locations of their logistics forces as their inventories increase.

Other important considerations not specifically included in PEACHS include access to sewage disposal, central proximity for operations, and distance to ports and runways.

In many ways, the considerations for choosing a CSSB site are the same as for choosing an FSB site. However, two distinguishing factors in the site selection process for a CSSB are sustainability and the distance from its home port. The CSSB is responsible for maintaining 3 to 14 days of supply, depending on the commodity. The CSSB's ability to sustain forward units is contingent upon the stocks it maintains and its access to home station supplies or alternate methods of resupply such as local purchase. Conversely, the U.S. Army's FSB sustains forward units primarily through supply point trans-

☐ **An Australian soldier checks vehicles to be used in a military training exercise.**

fer operations. The FSB does not maintain a large inventory but instead draws from the echeloned supply system. The FSB is resupplied by both the main support battalion and corps support units and therefore does not need to look for locations that can hold and sustain large quantities of supplies.

Lastly, since the Australians focus mainly on defending their island-nation from attack, they are not as engaged as the U.S. Army in force projection. They tend to choose locations that are close to their main home seaports. The United States has the logistics assets to sustain longer missions and reach out farther in the world.

Standardized Layouts

Just as the Australian Army and the U.S. Army are similar in their support location criteria, they also have common guidelines for the layout of their brigade-level support areas. In their respective doctrine, they have examples of the layout of all of the individual elements within the support area. Standardized layouts for units within the Australian brigade maintenance area (BMA) and the U.S. Army brigade support area (BSA) provide many benefits. For example, standard layouts provide soldiers with the opportunity to become familiar with the area quickly. With a standard layout, a soldier coming into an area at night has some idea of where to go without having been there before. A standard layout also allows forces to occupy an area faster, since they already know where and how they will set up their elements.

Australian and U.S. logisticians alike must account for technical and tactical requirements of their elements regardless of the terrain. Technical needs and tactical considerations sometimes will dictate deviations from the standard layouts, but the layouts provide a good baseline from which commanders and operations officers can plan.

A main difference in the layouts of a BMA and a BSA is in how they defend the overall support areas. Both armies are concerned with the security and defense of their bases. Elements in a BMA usually collocate in one area, set up one main base, and maintain a full perimeter to defend the entire base. They use only two entry points to minimize the places where visitors can come onto the base. The BSA, on the other hand, employs a base cluster technique in which each element of the FSB and maneuver unit field trains comprises a base. These bases integrate to form the defensive plan for the BSA. The BSA elements, or bases, do not have to cover a 360-degree perimeter because they have other units around them that cover part of the area. Therefore, it is crucial that the base commanders account for the other bases' capabilities in their defensive planning.

The considerations for laying out elements within the Australian Army's BMA and the U.S. Army's BSA are very similar. The layouts of both focus on simplicity and efficiency of operations. Both armies position their headquarters in the center, where they can maximize their command and control of the unit. In addition, they both separate their unit administrative areas from the technical areas. The medical elements of both the BSA and BMA are located deep inside the bases since these medical companies have limited defensive capabilities and still must function while under attack. Both forces also consider safety distances between commodities, such as ammunition and fuel, when planning the layout. Because the BMA has one large perimeter, CSSB planners know the importance of maintaining the integrity of each individual element within the BMA.

Australian and U.S. Army doctrines reveal many similarities in the factors used to determine the best locations and layouts for CSSBs and FSBs. The principles of the Australian CSSB siting acronym, "PEACHS," reflect many of the principles found in U.S. Army doctrine for the selection of FSB locations. Simplicity and efficiency are common themes of typical CSSB and FSB layouts. The differences, such as the importance of being close to home ports, can be attributed primarily to different logistics unit structures and types of missions. **ALOG**

Major Sandra L. Vann-Olejasz is an assistant professor of systems engineering at the U.S. Military Academy (USMA). She has a B.S. degree in computer science from USMA and a master's degree in business administration from Georgetown University.

The author thanks Cadets First Class Jon Hall and Tara Kitzman for their significant contributions to the preparation of this article. Agencies interested in sponsoring cadets from the U.S. Military Academy for summer academic internships should contact the academy's Operations Research Center at (845) 938–5897.

Less Bang for the Buck

by Captain Matthew J. Geraci

The author tells how his explosive ordnance disposal company met the challenges presented by the high operating tempo of a Kosovo deployment.

The mission of the 62d Explosive Ordnance Disposal (EOD) Company in Kosovo was to reduce and eliminate all explosive threats to U.S. soldiers supporting the Multinational Brigade East, their North Atlantic Treaty Organization (NATO) allies, and local civilians. Our company arrived in Kosovo on 18 October 2000 and departed on 5 May 2001. During that period, we responded to 438 incidents involving landmines, unexploded cluster bombs and ordnance of all types, and several kinds of timed and remote-controlled improvised explosive devices. We also provided support to cordon-and-search operations and taught classes about the hazards of unexploded ordnance to soldiers and local children.

The Perfect Mission

If ever there was a mission that could serve as a template for an EOD unit, it was the Kosovo mission. The 62d EOD Company thrived on the fast-paced tempo of incidents and the constant danger of an uncontrolled detonation. Tasked with EOD support of the entire Multinational Brigade East, we had to find a way to provide timely and efficient emergency response support around the clock.

The 62d EOD Company, based at Tooele Army Depot, Utah (just west of Salt Lake City), provides bomb-disposal support to the entire state of Utah, half of Nevada, half of Idaho, and seven counties in Wyoming. A typical year involves about 100 emergency responses to defuse military ordnance, remove decayed dynamite, and disable a few improvised explosive devices within the company's area of responsibility. The mission in Kosovo was quite a change of pace for the unit.

☐ A member of the 62d EOD Company emerges from one of the many caves used by terrorists to store weapons and explosives.

The company consists of five independent, mobile EOD teams and a headquarters element. The primary determining factor in planning operations in Kosovo was the small size of our company: 21 EOD technicians and 1 supply noncommissioned officer. We decided to split our sector in half and place two EOD teams at Camp Monteith in the city of Gjilane. The remaining three teams and the headquarters would remain in the eastern part of Multinational Brigade East at Camp Bondsteel. We would centralize reporting at Camp Bondsteel and dispatch teams from either site depending on the location of an incident.

Usually, one of our EOD teams was rolling toward a mission within 15 minutes of notification. Our goal of timely support provided the brigade's roving patrols with a sense of urgency to mark and report a potentially explosive item quickly so we could respond and mitigate the hazard. We also wanted to reduce the amount of

□Left, EOD team members inventory a weapons cache. Below is a Yugoslav TMA–3 antitank landmine, a common piece of ordnance found by the task force.

time the roving patrols spent waiting for a team to arrive at an incident site. Quick reaction to unexploded ordnance (UXO) reports and efficient response saved time for the roving patrols in the sector and allowed us to spend more time reducing threats to soldiers and civilians.

During cordon-and-search missions, the 62d was called in to render safe any booby traps, explosives, or military munitions found in local homes. We also searched for hidden weapons caches in the many caves and caverns throughout the Kosovo countryside. Those caches were particularly dangerous because of the poor condition of the explosives they contained and because booby traps and mines sometimes were placed with them. Our EOD technicians also had to be vigilant of the possibility that transported weapons could be booby-trapped. We often investigated reports of weapons being transported in small cars, big trucks, and even by horse and mule trains.

One memorable event involving a cache occurred when a Polish foot patrol found a Chinese Type-56 rifle (similar to a Russian AK–47) lying at the mouth of a small cave. The Polish soldiers pulled back from the area and set up a security perimeter. The 62d EOD Company was called in because there was a fear that the rifle lying in front of the cave was booby-trapped. An even greater fear was the beeping sound emanating from the mouth of the cave every 17 seconds.

The EOD team used painstakingly slow and deliberate remote techniques to clear the mouth of the cave and then removed a large quantity of landmines, small□arms, and remote-controlled detonating devices. They entered the cave safely and discovered that the beeping sound was coming from one of the many homemade detonating systems inside the cave. Successfully seizing these devices ensured that they would not cause any more harm in the future□

A Lethal Landscape

Fighting occurring in the Kosovo area as far back as World Wars I and II and continuing to the recent invasion by Serbian forces and the subsequent air campaign launched by NATO forces has left the countryside littered with thousands of pieces of UXO. The "meat and potatoes" of our mission was to render the area safe and eliminate threats to our forces and the local population.

All soldiers deploying to Kosovo receive training on how to identify UXO, how to mark it, and how to call in a nine-line UXO report. Training in identification and render-safe procedures is especially important to an EOD

technician who must disarm a piece of ordnance. His goal is to keep people in the surrounding area from harm and mitigate damage to surrounding structures if the ordnance is detonated. While in Kosovo, 62d EOD Company technicians identified, rendered safe, and destroyed munitions dating as far back as World War II (a vintage German artillery projectile), as well as modern cluster bombs and submunitions.

In one instance, a grenade had been thrown onto a second-story balcony of a house, but it had not exploded. An onsite patrol evacuated the area and called the 62d EOD Company. The team leader donned protective gear and proceeded downrange with ropes, pulleys, hooks, and sandbags. His dilemma was how to defuse the grenade, which could detonate with the slightest jarring, without injuring himself or others or causing further damage to the house. The team leader quickly devised a remote rope and pulley system and built a sandbag pit. He then rigged up an ingenious slipknot system that would grasp the grenade to pull it into the protective sandbag pit. He set up the system, moved to a designated safe area, and activated his system of ropes and pulleys. The system lifted up the dudded grenade and carefully pulled it down into the pit. The grenade was detonated in a controlled environment without injuries or collateral damage to the Kosovar's house.

Fighting Terrorism

Terrorists use bombs to strike fear in the hearts of people or to kill or maim a target group or person. Sometimes the target might be law enforcement officers or the EOD teams.

The toughest incidents we had to deal with involved mechanically timed bombs. The 62d responded to several incidents involving placed improvised devices, sometimes after the explosion had already occurred. A house or church would be blown up, and we would be called to the scene to search for any secondary device that could cause further destruction. We also would conduct basic post-blast forensic investigations to determine the size and kind of bomb that had caused the explosion. This information then was relayed to the task force headquarters for analysis.

Soldiers of the 62d EOD put their lives on the line to demonstrate the U.S. commitment to secure and stabilize the environment in Kosovo. On three separate occasions, teams from the 62d EOD successfully stopped a device from detonating and recovered enough forensic evidence to link all three bombs to one individual. In each case, the team leader evacuated the area, donned protective gear, and carried his tools on the "long walk" to disarm the device. The forensic evidence collected supported a criminal case against the terrorist and impelled the authorities to capture and imprison him. The terrorist's arrest occurred during the last week of our rotation. That was a proud moment in the history of the 62d EOD. We helped bring a criminal to justice and stopped a bomb maker, leaving Kosovo a safer, more secure place.

☐ Members of the 62d EOD Company lay out captured weapons and explosives, which were subsequently destroyed.

The Littlest Victims

Most of the locals in Kosovo already have an understanding of military ordnance and what it looks like. They tend to stay on well-traveled routes and do not wander into unknown territory. But what about their children?

The soldiers of the 62d EOD Company are experts in the field of rendering explosive ordnance safe and have taught literally thousands of safety classes. However, we knew that teaching children would be totally different. We consulted the Swedish United Nations Mine Awareness Team about how to teach the local children

☐ At left, the fiery destruction of an unexploded cluster bomb found on the side of a main road near Camp Bondsteel lights up the night sky. Below left is a clock that would have detonated a bomb if not for the quick actions of an EOD team leader. Below, confiscated weapons are laid out for display before disposal.

about the hazards of UXO. We had to learn how to put aside our technical language and speak in terms that 5- and 6-year-old children could understand. We talked about colors, shapes, and sizes rather than using technical military jargon. We taught the children using mousetraps as examples; we set up various mousetraps and then told the children that UXO can be set off just like a mousetrap. Our rationale was that if the children knew that a mousetrap could hurt them, they would understand that a mine could do much worse. Nearly all of the children we taught had seen some type of UXO or landmine. Amazingly, some children even took the EOD teams to UXO sites after the class was over. Teaching the Kosovar children UXO safety and to trust Kosovo Peacekeeping Force soldiers was one of the most rewarding experiences of our deployment.

The Army's EOD mission in Kosovo puts to use every aspect of training that an EOD technician receives in his career and more. There are no second chances or "do-overs" for EOD personnel. The EOD mission in Kosovo protects our own soldiers and provides a safer environment for the Kosovars as well. The various ethnic groups throughout the region have come to recognize members of the rotating EOD companies as friends and helpers.

The 62d EOD returned home from its Kosovo rotation with a 100-percent safety record—an indicator that the company indeed had provided Task Force Falcon with *less bang for the buck!* **ALOG**

Captain Matthew J. Geraci is an instructor and active duty liaison with the 3d/360th Training Support Battalion (USAR) in Salt Lake City, Utah. He has a bachelor's degree in physics/nuclear engineering from the U.S. Military Academy. He commanded the 62d Explosive Ordnance Disposal Company from April 1999 to August 2001.

This article is dedicated to the memory of EOD team leader Staff Sergeant Justin Galewski, who served with the 62d EOD in Kosovo and was killed in the line of duty in Afghanistan on 15 April 2002.

Using Forward Logistics Elements

by Colonel Raymond V. Mason and Major James D. Hess

The 25th Infantry Division's warfighter exercise provided division logisticians an opportunity to test the benefits of supporting with forward logistics elements.

The use of ad hoc organizations of combat service support (CSS) assets like the forward logistics element (FLE) is not new. But as the battlespace used by U.S. forces becomes less linear and the Army engages in combat with more adaptive enemies, we believe that FLE applications will only expand. We found this to be the case during the 25th Infantry Division (Light) warfighter exercise (WFX), when the use of FLEs helped to solve the challenges of the contemporary operating environment.

The WFX, like other division- or corps-level exercises, was simulated using the computerized Corps Battle Simulation (CBS); it was fought against a world-class opposing force (OPFOR), which was linked by satellite through the simulation to Fort Leavenworth, Kansas; and it was observed and controlled by the Battle Command Training Program (BCTP).

The BCTP OPFOR has gone through a recent upgrading of capabilities and doctrine, creating what is referred to as the "contemporary operating environment." The BCTP has injected into this environment a significant amount of asymmetric capabilities, primarily built around commando companies and terrorist organizations. The conventional forces have been improved with increased tube and rocket artillery and a large amount of anti-aircraft systems. The OPFOR's artillery doctrine and capabilities no longer have the enemy deploying in regimental and divisional artillery groups. Instead, the enemy, in a way similar to U.S. doctrine, disperses his systems and uses an integrated fires center to mass fires on targets.

CBS simulates combat by calculating the variables affecting dynamic forces (in this case, the 25th Infantry Division and the OPFOR) to decide situational outcomes. The results of tactical engagements are determined using preset weapons effectiveness and force ratio (friendly to enemy forces) multipliers. Logistics operations are simulated by applying consumption factors to operational postures (such as attack or defend) and are affected by tactical outcomes.

CBS has limitations in replicating the details of real logistics operations. However, the 25th Infantry Division's successful application of support in a nonlinear environment through the use of FLEs serves as a proof of the FLE concept that other units can explore further. We have used the concepts outlined in this article with success, both here in the 25th Infantry Division during local training events and at the National Training Center and the Joint Readiness Training Center. What follows is a description of the division's situational concept, under the conditions we faced during the WFX. It provides one suggested method of supporting nonlinear operations in a contemporary operating environment.

The 25th Division Support Command's (DISCOM's) use of FLEs to distribute logistics capabilities across the division's battlespace enabled those assets to support maneuver operations responsively and then to preserve their capabilities through aggressive rear battle (although the distinction between deep, close, and rear operations becomes blurred on a nonlinear modern battlefield). Logistics commanders resourced the organization of FLEs and managed their capabilities based on current and future operations in order to put the appropriate logistics capabilities at tactically significant places at the right times.

Our condition set required commanders to organize and operate units at the level of the infantry battalion task force and below to offset the capabilities of a new and dynamic OPFOR willing to fight in a decentralized fashion while being distributed over a nonlinear battlespace. Through the use of FLEs, ad hoc logistics units became fully integrated members of infantry task forces, capable of maneuvering with them and sustaining tactical operations as part of their combined arms team. The factors of mission considerations, enemy, terrain, troops, time available, and civilian (METT–TC)

also required commanders to shift their mindsets from providing logistics from large, tiered support bases (such as brigade, division, and logistics support areas) to task organizing logistics forward (the "support forward to the foxhole" philosophy).

Setting the Stage

During the WFX, the 25th Infantry Division fought in Bosnia and Herzegovina against the OPFOR. The division also fought as part of I Corps, which was located on the flank of a separate multinational coalition corps and was part of a combined joint task force.

Major General James Dubik, the division's commanding general, chose to attack with his light forces through mountainous terrain on the left and right flanks and to focus the division's attached armored brigade in the center to achieve mass effects on the enemy. To meet the corps commander's intent, he planned for his brigades to move rapidly to create two predominant effects on the decentralized enemy: deny him the ability to focus his forces and simultaneously present him with multiple problems. Working with an intent focused on its effects on the enemy, instead of an intent focused on the disposition of friendly forces, is a separation from conventional task-purpose-end state intents. Commanders and staff planned and executed operations not as members of a hierarchical organization but as a single, cohesive force focused on achieving the desired mass effects on the enemy.

Commander's Intent

The DISCOM's intelligence preparation of the battlefield indicated that the enemy's most likely (and in fact most dangerous) course of action was to let our combat forces (light infantry with attached mechanized units) pass by and then attack the "softer" CSS units, which normally follow in trail or are conducting ground resupply operations. The DISCOM commander's intent included "tucking up" FLEs with infantry battalion task forces in the restrictive mountainous terrain and using multiple modes of resupply (ground, slingload, and airdrop) to facilitate momentum and achieve maneuver logistics. Joining FLEs with the task forces provided the FLEs with mutual security while simultaneously denying the enemy lucrative logistics targets.

The FLEs carried 2 days of supply and were task organized with main support battalion (MSB) and corps support battalion (CSB) assets to generate independent logistics capabilities; in this way, the FLEs would not rely primarily on ground lines of communication (LOCs) in the nonlinear battlespace. Those 2 days of supply, along with the combat and field trains, provided 3 to 4 days of supply that were organic in the task force. This task organizing and maneuvering of CSS capabilities based on METT–TC, just like the task organizing of light infantry and mechanized forces, created new opportunities to mass logistics at the critical point on the battlefield, just as the Army has always done with artillery fires.

The DISCOM (-), with the remaining MSB and CSB assets, focused its efforts on meeting the requirements of the division's attached armored brigade, which had a more traditional array of combat and support forces. We also developed an aggressive air resupply plan using preplanned helicopter, C–130, and C–17 mass supply and Container Delivery System drops.

With FLEs integrated as full-fledged members of combined arms teams, we did not provide the enemy with any significant "soft" targets. The light brigade combat teams (BCTs) on the flanks executed their missions without any ground resupply above the forward support battalion (FSB) level for the first 4 days of the battle. We immediately established a ground LOC for the armored brigade in the center because of its significant fuel requirements. Since we initially did not have to conduct ground resupply to the 2d and 3d BCTs on the flanks, we could concentrate our ground division- and corps-level logistics movements on just the armored brigade. By the time we did have to establish a ground LOC to the 2d and 3rd BCTs, the enemy generally was retreating and on the defensive and thus was unable to mass any major ground attacks on our convoys.

Collaborative Planning

The division's method of planning was as important as the plans themselves. Division, brigade, and battalion staffs used collaborative planning to simultaneously share information and develop detailed plans. During the predeployment military decisionmaking process, and, in fact, throughout the WFX, staffs and commanders used video teleconferencing in a dynamic planning process; this eliminated the need for operational pauses during incremental development of plans to travel between command posts. The staffs were able to produce multiple, multi-echeloned plans almost simultaneously across the division in a centralized environment with relevant and shared information.

This collaborative technology enhanced the process and facilitated General Dubik's effects-based intent of maintaining a high tempo with fast movement of forces throughout the operation. It put the division in the position of "winning on the offense," as Army Chief of Staff General Eric K. Shinseki often says.

Distributed Logistics Operations

As an example of how the division fought and was supported, let's focus on the division's 3d BCT, which was one of the two BCTs operating in mountainous terrain on the flanks. The 3d BCT conducted the main effort for three consecutive engagements (phases)—at-

Not "The" Solution
A 'Way to Think"—An Approach to a Problem

- **Support forward to the foxhole. Don't husband assets.**
- **FSBs focus on brigades. The MSB pushes assets to FSBs and supports division troops. The FSB guidon is a "stake in the ground" to build upon. Attach corps assets (supply, transportation, maintenance, medical).**
- **Commanders own everything in their units. The MTOE is only a document. Task organize and do what is best for the supported unit (BCT).**
- **Division materiel management center, division medical operations center, and support operations officer are the logistics "brain trust." They are logistics synchronizers—empower them to execute.**
- **Command and control = key leader + communications + vehicle (tactical operations center) + security.**
- **Logistics is all about battlefield distribution (palletized load system, HEMMT–LHS, sling load, heavy drop).**
- **Commanders = Accept risk where you are, never away from you. Push assets forward.**
- **Asset visibility (Total Asset Visibility and Movement Tracking System) provides logistics flexibility.**
- **Focus on your supported unit. Do what's right for them.**

☐ The condition set developed for a division-level Warfighter exercise in the contemporary operating environment.

tacking across 80 kilometers of mountainous terrain, crossing two rivers, fighting through or around four cities, air assaulting, truck assaulting, infiltrating, and completely routing the enemy 5 days, and 120 kilometers, later—and it remained combat effective on cessation of hostilities. Here is how the 3d BCT applied the FLE concept to support high-tempo operations against a contemporary enemy on challenging terrain.

The 3d BCT planned on attacking for approximately 2½ days through rugged, mountainous Balkan terrain, mostly on one-lane unimproved roads connected by little more than "goat trails"—in other words, light infantry country. Throughout the operation, the BCT task organized itself for movement on two separate routes that were actually a series of connecting trails. The resulting BCT formation created two parallel truck-mounted and dismounted "ranger files."

The extended files posed a problem for the FSB: it would have difficulty supporting along the route if it was posted as the trail element. (The 325th FSB supported the 3d BCT.) The solution to supporting such a long movement file was for the FSB to task organize itself and distribute an FLE to each infantry task force along the route. Distributed logistics with a direct support (DS) capability forward (drawn from FSB, MSB, and CSB assets) was needed for early sustainment of operations.

An ancillary effect of habitually associating DS capability forward with task forces was that the FSB and the brigade support area (BSA) could get as large or as small as required. Because critical capability was already embedded into the FLEs, the FSB (-) could receive a large corps push and sustain units from it rather than being forced to issue the supplies in order to move. This enabled a usually austere FSB (-) to provide area support throughout the operation to corps artillery, air defense units, engineers, and the division cavalry squadron located within the brigade sector.

Because of the challenging terrain and absence of permanent, secure LOCs in a nonlinear battlespace, the traditional use of CSBs forward and corps throughput was not practicable. The corps simply could not conduct throughput in this environment against this enemy because the roads would not handle two-way traffic and the enemy could cause significant damage to any CSS convoy moving across terrain in a noncontiguous battlefield (that is, terrain not controlled by friendly forces). The FSB (-) became a supply center, and the FLEs were its distribution elements. Successful logistics operations are all about battlefield distribution! (In the 2d BCT, we executed a similar concept, except that it required only two FLEs instead of the three needed for the 3d BCT.)

Such a task organization does not come without drawbacks. Creating multiple FSB subunits dispersed the FSBs' already austere command and control capabilities and also strained CSS capabilities. The lack of modularity in light FSBs forced commanders to make tough task-organization decisions in order to support forward. However, the benefits of using multiple FLEs vastly outweighed any friction that ensued.

Over-the-Shoulder Logistics

With a responsive DS logistics capability forward, maneuver task force commanders (and corps units in the brigade sector) only had to look to their supporting FLEs to satisfy their requirements. Operational pauses to receive logistics packages or preplanned pushes were not required; logistics was provided over the shoulder (right there when you need it) by FLEs.

In task organizing FLEs from their FSBs, the CSS capabilities of the FLEs were as much of a concern as their proximity to maneuver task forces. Light FSBs cannot split their functional capabilities over a distance without marginalizing their limited assets; for example, a maintenance section with three soldiers and one vehicle cannot be split. Through corps and MSB augmenta-

tion and a little built-in modularity achieved through subunit organization, the FSBs task organized using the following principles—

- Medical treatment was positioned closer to projected points of injury. These points and the medical treatment assets were determined by casualty estimates and anticipated conflict intensities. The average daily casualty estimate for a BCT was 200 soldiers (which turned out to be fairly accurate). The additional treatment teams and ground and air ambulances from the MSB and corps placed forward with FLEs helped hold the died-of-wounds rate to no more than 2 percent of casualties.
- Components were replaced forward, and end items were returned as quickly as possible. DS armament and automotive expertise placed forward with FLEs helped keep critical systems from being evacuated to the BSA (which would have been time consuming because BSAs moved daily). Smaller and less-critical items still required evacuation to FSBs. Also, an MSB/CSB maintenance support team (-) was added to the FLE that supported the task force organized with the heavy team.
- At least 1 day of all classes of supply was hauled in each logistics node: combat and field trains, FLE, and FSB (-). Without stocks positioned forward with the task forces, operational pauses would have been needed to rearm and refit using logistics assets brought from further away than the FLEs. To compensate for unexpected engagements and increased requirements, the FLEs received prepackaged ammunition through preplanned aerial resupply by both rotary- and fixed-wing aircraft to preselected landing zones and drop zones.

The FLE and FSB (-) Relationship

The relationship between FLEs and the FSB (-) is symbiotic; they have a mutually beneficial coexistence. The principle strength of the FSB is its ability to provide continuous support to a BCT during sustained operations, while the strength of FLEs is their ability to be immediately responsive, flexible, and mobile. The interaction of the FSB (-) and FLEs can make both more effective.

During the WFX, the FSB (-), as the principal supply center, was able to resupply FLEs at any time. Each FLE provided DS to its dedicated task forces for all requirements. The decreased turnaround time from FSB to FLE and from FLE to task force saved hours between supply and maintenance exchanges and, when supporting combat units on the attack, maximized combat momentum. The FSB (-) or the BSA pushed supplies to FLEs on its own schedule, unrestrained by a higher resupply level's timeline.

Using the same methodology, the FSB (-) also was successful at pushing supplies that permitted rapid tactical transitions. Using anticipatory logistics, the FSB (-) built and pushed class IV barrier packages to the FLEs for transitions to defense and provided ammunition within minutes of the combat forces' needs. All of this was virtually transparent to the supported task forces.

FLEs also permitted the FSB (-) to create echelons seamlessly at times when it otherwise would have been difficult to do so. While they were on the move, FLEs established forward drop zones to receive supplies in areas that subsequently grew into BSAs when the FSB (-) arrived. FLEs also established and operated forward engineer class IV and V (ammunition) points so they could receive corps pushes or airdrops near obstacle emplacements; this was a benefit of the FLEs proximity to maneuver task forces. The creation of the forward engineer points also reduced transportation requirements and the double handling of supplies.

Another example of the way the FSB (-) provided continuous support to the task forces' requirements through the responsiveness of the FLEs was the FSB's ability to control and redirect shipments within its zone. For example, when a division cavalry forward area refuel point (FARP) was attached to a FLE, the FSB was able to redirect a corps convoy of fuel to the FARP location to fill a 10,000-gallon fuel bag.

FSB commanders also could weight the CSS main effort through task organization. As FLEs are established for mission-specific requirements, FLEs supporting identical forces do not need to be identical themselves. During the WFX, FSB commanders reorganized in conjunction with changes in BCT mission and task organization, shifted trucks among FLEs to transport personnel, and rearmed units in contact with the enemy with ammunition from other FLEs.

Hardening a Soft Target

Throughout the operation, FLEs moved with their supported maneuver task forces. They seldom were separated from their task forces by more than 3 to 5 kilometers. FLEs sometimes were nested into battle positions with maneuver forces. Although it may seem risky to move DS assets forward, it is just as risky not to do so in a nonlinear battlespace because not moving will separate the FLE by time and distance from maneuver and security forces. Moving FLEs independently from any other force could place the FLEs at risk of taking on the full effects of a nonlinear close fight. "Tucking up" FLEs to maneuver task forces created the benefit of security through proximity.

An unintended byproduct for the FSB resulted from attaching FLEs to maneuver task forces. Because it no longer had the assets used to make three complete FLEs from an FSB, the residual FSB (-) was not a lucrative target for the enemy. The WFX after-action review indicated that the BSA was not even considered a high pay-

off target for the OPFOR commander like other support areas and logistics nodes. The enemy kept searching for large logistics areas with massive stocks and other logistics assets to attack, but they simply did not exist.

In another passive security measure, the FLEs and FSB (-) used main supply routes (MSRs) only when absolutely required. It was safer for these units to travel on BCT-cleared secondary routes. While the enemy searched for lucrative "soft" targets traveling on the best roads, FSB assets were moving on the secondary routes and therefore did not become targets. When the FSB (-) was required to use MSRs (for example, for receiving corps pushes), it was able to establish first-destination reporting points along the MSRs to receive pushes and provide directions to where the BSA or FLE was located.

Passive security measures for logistics air operations also were critical to the division's success. Because of difficult terrain, high operational tempo, and the asymmetric threat, the distribution of logistics was primarily through air resupply. To protect forward slingload missions in nonlinear areas, the 25th DISCOM integrated air resupply movement plans into attack aviation and air cavalry missions. Under these plans, air resupply missions receive added protection from artillery suppression of enemy air defenses and accompanying AH–64 Apache attack helicopters and OH–58 Kiowa observation helicopters. Resupply aircraft generally moved in coordination with attack aircraft in air corridors to FLE and FSB landing zones and then rejoined the attack aircraft on their return trips. Since the division's aviation assembly area was adjacent to the division support area (DSA), this coordination and linkup was virtually seamless.

On rare occasions when the FSBs were involved in direct enemy action, the dispersal of the FSB among four distinct logistics nodes (the BSA and three FLEs) and points in between helped to reduce even deliberate attacks. For example, on D+2, a FLE was destroyed in an artillery attack. Within just a few hours, the FSB commander shifted assets from the other FLEs and the FSB (-) to regenerate that FLE. Class VII (major end items) and personnel replacements were redirected to the FSB (-), which temporarily went into an amber status for some supplies until replenishment for the losses came by air from the corps and the MSB the next day.

In response to a decentralized threat and liberal bypass criteria (for example, friendly forces could bypass enemy platoon-sized elements rather than destroy them), the 3d BCT attached the brigade's DS military police platoon to the FSB and also placed all MK19 automatic grenade launchers in the brigade rear under the operational control of the FSB. In the final toll, the FSB had command and control of 18 MK19 teams for route security, counterreconnaissance, and countersurveillance and was allocated the brigade tactical combat force on several occasions. Active measures to flush out enemy special-purpose forces resulted in over 100 kills for the MK19 "company" by the end of the operation with only two friendly losses. More importantly, every ground CSS element moving among FLE locations, or between the FSB and FLEs, moved with MK19 fire power, providing the convoys with superb protection.

Taking It From Here

Here are a few suggestions for commanders and support operations officers for future operations—

- Unless heavily augmented from corps or MSB assets (as the 25th Infantry Division's FSBs were), FLEs for maneuver task forces tax the force structure of the FSB. Basic requirements like leadership positions and FSB command and control communications systems cannot be split four ways. FSB commanders must decide on the use of FLEs when they complete their mission analysis and before the maneuver decision brief so the FLEs can be resourced adequately by the BCT and the DISCOM.
- FLEs always should be built with multiple transportation (distribution) modes and redundant CSS capabilities. Although the FLE is a very effective distributor, it directly affects momentum if it does not receive assured support from the FSB (-). In severely restricted terrain and nonlinear battlespace, logistics operations can go quickly from being a combat enabler to restricting combat operations. To mitigate risk, resupply operations should use secured secondary routes, prepackaged emergency slingloads from the DSA, mass supply airdrop, and the Container Delivery System; critical resupply missions must be kept on the air tasking order.
- Austere support unit modification tables of organization and equipment (MTOEs) should not be allowed to dictate operational decisions or limit commanders' options. FSB commanders should task organize their units in whatever manner best meets the mission requirements. At a minimum, commanders should consider the following requirements when determining task organization: organic lift, rear area security, maintenance lift in FLEs, additional forward area refuel equipment and forward area water point supply systems or water blivets, satellite communications systems, and medical evacuation. FSB commanders should determine what is needed to meet the tactical commander's requirements and then enlist the assistance of the DISCOM headquarters to resource it.

Where the Army Can Help

Force modernization fixes could help improve the ability of light FSBs and MSBs to support combat operations on the modern battlefield. Nonlinear battlespace

with an adaptive enemy demands changes from traditional organizations and operations. Changes are especially acute within 195-soldier FSBs. Force modernization changes that would enhance the FSB/FLE capability to support maneuver forces include—

- Modularity. This would enable the FSB to split its varied capabilities in many different ways to establish FLEs more easily and respond to the changing requirements of dynamic battlefield environments. A unique section with three soldiers and one truck cannot be split effectively. One way to increase modularity without increasing the unit's end strength is to equip light FSBs immediately with highly capable systems (like the heavy, expanded-mobility, tactical truck-load handling system (HEMTT–LHS); all-terrain lifter-Army system [ATLS] forklift; and Movement Tracking System) to add capability without increasing force structure.
- Redundancy. This can be achieved by using more, smaller modules. The gains in effectiveness far outweigh the risks incurred; using modules also adds priceless operational flexibility. In building redundancy, FSBs need equally redundant command and control communications systems and battalion-level staffing to have truly redundant capability. FSBs (and MSBs to a lesser but critical extent) have virtually no redundancy, with many military occupational specialties, key CSS equipment, and command and control systems numbering only one or two.
- Command and control communications systems. These will permit FSB decentralized operations. Digitized or not, an FSB needs to connect to subelements and supported maneuver task forces reliably while on the move and on rough terrain. The MTOEs of FSBs and MSBs provide only enough radios to conduct static operations and command and control of their organic companies, not enough to provide command and control for the BSA or DSA (which expand from 3 to 5 organic companies to 8 to 15 companies in the BSA or DSA). The MTOEs also do not take into account the nonlinear and distributed security requirements of an asymmetric enemy. CSS units must have visibility of assets and the ability to control and redirect those assets while on the move if they are to adequately support the maneuver commander's needs on the fast-paced nonlinear battlefield.
- Lethal systems. These will increase the ability of FSBs and MSBs to fight and win. Nonlinear operations bring the close fight to support units. The present quantity of crew-served weapons in FSBs and MSBs is woefully insufficient for the battlefield of the 21st century. Additional ring-mounted .50-caliber machineguns and MK19s are required if FSBs and MSBs are to survive to execute their support mission. A light FSB has only four .50-caliber machineguns and two MK19s.
- Leader development. We need to develop and institutionalize methods of training leaders to be logisticians who contribute to combined arms teams. The Combined Logistics Captains Career Course and Support Operations Course at the Army Logistics Management College represent a good start in producing multifunctional logisticians, but Army logistics must continue to match the exponential changes in warfare. The Army Training and Doctrine Command's CSS plans of instruction must be expanded to provide for analysis and development of wide-open solutions and eliminate the stovepipe, functional, and hierarchical CSS concepts of support that still prevail in the Army. In our opinion, flexible task organizing and maneuver logistics, as outlined in this article, are not sufficiently included in today's plans of instruction. But they must be if the CSS community is going to meet the challenges of the modern battlefield.

Organizational and institutional improvements are important, but they are only half of the solution. Complementary operational changes in doctrine are needed to codify new tactics, techniques, and procedures.

For the 25th DISCOM, detailed and open-ended planning with effects-based intent and outcomes kept our options open, our supplies flowing, and our combat power at effective levels throughout our warfighter exercise. For this particular exercise, the employment of dedicated FLEs helped speed the division's winning of the battle and the transition from offensive to peace enforcement operations. **ALOG**

Colonel Raymond V. Mason is the commander of the 25th Infantry Division (Light) Division Support Command at Schofield Barracks, Hawaii. He recently served as special assistant to the Army Deputy Chief of Staff, G4, for Transformation. He holds a master of science degree in logistics management from the Florida Institute of Technology and a master of arts degree in national resource strategy from the National Defense University. He is a graduate of the Army Command and General Staff College and the Industrial College of the Armed Forces.

Major James D. Hess is the support operations officer for the 325th Forward Support Battalion at Schofield Barracks, Hawaii. He holds a master of science degree in logistics management from the Florida Institute of Technology and a master of military studies degree from the Marine Corps University. He is a graduate of the Army Logistics Management College's Logistics Executive Development Course and the Marine Corps Staff College.

Olympic Villages for the Military

by Major Winfried E. Scheel

More than 5,200 military personnel were activated and deployed as part of Joint Task Force-Olympics (JTF–O) in Salt Lake City, Utah, for the 2002 Winter Olympic Games. The widely dispersed Olympic venues and the expected transportation gridlock made it necessary for the soldiers to be housed in various locations near the areas in which they would be working. This required seven life support areas (LSA's) and three military facilities.

Each LSA was a minivillage that provided a secure perimeter with military police gate guards; a sleeping area; an eating area; showers and toilets; an Army and Air Force Exchange Service store; a barbershop; washers and dryers; drycleaner service; a recreation area with satellite TV, table and video games, and a workout area (some had an indoor basketball court); and much more. LSA's were strategically located to provide the best coverage and least amount of transportation time to and from Olympic venues.

Change of Plans

JTF–O's original plan was for approximately 2,400 military personnel to support the Olympics, with no more than 1,900 on the ground at any one time. The plan called for personnel to be housed in existing military facilities at Hill Air Force Base, Camp Williams (a Utah National Guard training facility), Tooele Army Depot, Dugway Proving Ground, and the Salt Lake City Veterans Hospital. The only nonmilitary facilities planned for use were rented trailers to house as many as 150 personnel in Heber City, which is over 50 miles from Salt Lake City on the east side of the Wasatch Mountains.

After the terrorist attacks on 11 September 2001, all previous plans were obsolete. The security requirements for the Olympics increased so much that the military bases that previously had been large enough to house the soldiers were no longer adequate. A new plan had to be developed.

Task Force Logistics

The 13th Corps Support Command at Fort Hood, Texas, provided a four-person planning cell that would develop the logistics plan for all of Task Force Logistics (TF LOG). The team consisted of a commander, a support operations officer, a transportation officer, and a food service supervisor. The team from Fort Hood joined the understaffed JTF–O logistics (J4) section to become one organization.

TF LOG's early objective was to identify as many housing locations as possible that were close to the Olympic venues, were defensible, and could provide living quarters for more than 300 people per location. The Salt Lake City joint operating area consisted of over 3,800 square miles in northern Utah. TF LOG considered 14 apartment complexes that could accommodate a total of 3,500 personnel. They also looked at a disabled persons training camp, old school buildings no longer in use, a former silver mine turned museum, condominiums, entire hotels, school gymnasiums, numerous churches, Army National Guard armories, and Army Reserve centers.

The biggest problem was the competition for scarce resources. TF LOG had no "earnest" money to hold a location until the budget was approved and funds were available for rent. The Department of Defense (DOD) budget was approved in late November 2001. By that time, key properties in great locations were no longer

☐ A contractor constructed walls and provided beds for the sleeping area at the Park City LSA (left). Above, the photo shows a covered walkway built outside the Heber City LSA to provide shelter for soldiers en route to the shower trailer.

☐ **Shoppers check out the AAFES store inside the Rocky Mountain LSA.**

available. This was a major financial shortcoming. With as little as $5,000 in earnest money, TF LOG could have saved $122,000 at the Park City facility alone.

Site Considerations

Apartment complexes. These would have enabled TF LOG to put 300 to 600 personnel together in one area. However, force protection at apartment complexes would have been very intrusive and complicated. Food service at apartment complexes without any cooking, serving, and eating areas was nearly impossible. The alternative considered was to provide per diem for everyone. Per diem is nearly twice as expensive as providing meals and requires more transportation so that everyone can subsist on the economy.

Tents. Heber City presented few options for housing other than using tents. Heber City is at a higher elevation and is colder, snowier, and windier than Salt Lake City. Living in a tent city would have been miserable.

Warehouses. Based on the support operations officer's experience living in old buildings and warehouses during a 1996 deployment to Bosnia, TF LOG decided to use warehouses to provide an LSA in Heber City. They rented warehouses and part of an airplane hangar from local businesses near the Heber City Airport. These provided enough space to billet everyone.

After determining that apartment complexes would not provide suitable LSAs in Park City and Salt Lake City, TF LOG asked an apartment broker about the availability of warehouses there. He located two within a few hours. The first warehouse was too old, but the second was perfect.

Plans for Using Warehouses

TF LOG then discussed some ideas with a general contractor and, with his input, began to formulate plans for a turnkey operation. The contractor would set up, maintain, and later tear down everything needed to run a life support area under one roof. This plan required building walls, installing power and lights, and providing furniture and equipment. The contractor would provide sleeping areas with beds; recreation areas with sofas and chairs, televisions, videocassette recorders, cable or satellite television connections, pool tables, table tennis, foosball, and air hockey; dining areas with tables and chairs; laundry areas with washers and dryers; and bath areas with showers, sinks, and toilets.

The contractors developed a plan to build sleeping areas with walls and carpet for noise reduction, dining areas, and recreation areas. After all soldiers moved out of the LSAs, the contractor would remove everything and return the building to its original state. The project needed to be completed and fully operational and meet Occupational Safety and Health Administration and other Government regulations within 45 days, which made it more challenging for the contractor.

By the time the contract was signed on 7 December 2001, the basic plan was already in motion. The contractor had asked for 45 days to complete the project, but the opening date for all LSAs was set for 12 January 2002. With the holiday season at hand, the timeline was compressed significantly, but the contractor felt confident that his firm still could meet military requirements.

Property Problems in Park City

The first critical problem was that a competitor was offering the Park City warehouse owner more money, and TF LOG came close to losing this key property. The competitor turned out to be the U.S. Secret Service, which wanted only a third of the building for equipment screening. TF LOG called the Secret Service negotiator and arranged with him to share the building if together they could negotiate a better price. The Secret Service reevaluated their requirements and determined that they really did not need the building. This allowed TF LOG to be the sole negotiator for the property.

Next, the owner of the building nearly doubled the asking price because of sudden pre-Olympic interest. TF LOG found other properties in the area and was prepared to walk away from the negotiation when the owner dropped his price to a rate DOD could afford. TF LOG ended up paying more than the original asking price because budget delays held up the contracting process, but they were out of time and needed the location. The contract for the Park City warehouse was signed on 20 December 2001, leaving only 25 days to complete the project.

Sewer Problems in Heber City

A key issue that nearly stopped the project in Heber City was the lack of adequate sewage disposal. The

☐ **A local television news crew interviews the contractor about the teardown of the Park City LSA.**

septic tank that serviced three of the four buildings was inadequate for the number of people who would be living there, and there was no septic tank for the fourth building. Numerous meetings with Wasatch County water and sewage officials produced a costly but effective system of holding tanks, pumps, and trucks taking the sewage to the city disposal facility.

Red Tape

Local fire, health, and safety officials cleared the way by working directly with the contractor to meet requirements and remove other obstacles. Together with the contractor, TF LOG personnel visited city, county, and other public officials with copies of the plans and an explanation of what they needed to accomplish. They explained how important this project was to the security of the Olympics and that they could not go through the public disclosure process because they needed to keep locations confidential for security purposes. The local officials understood the need and responded with positive support.

LSAs Open

The Ogden, Great Basin, Rocky Mountain, and Heber City LSAs opened on 12 January, and the Park City LSA opened on 15 January. Work on the Park City LSA was started on 4 January after work crews finished the other areas. They were able to complete it in less than 10 days because of the experience they gained at the other LSAs.

Working Out the Bugs

Numerous problems occurred during the first 2 weeks after the LSAs opened. These problems included heating system failures in two buildings, sewage problems at three locations, hot water shortages, not enough showers, drainage problems, and a myriad of other major and minor challenges. The contractor addressed and resolved the problems as quickly as possible, with very little inconvenience to the tenants.

When the sewage backed up in the Park City LSA, all personnel were transported to the Heber City LSA for one night while the system was cleared and the building cleaned. Fortunately, the incident occurred when only 170 personnel were living in Park City and less than 80 were staying at the Heber City location. TF LOG and the contractor developed contingency plans each time one of these incidents occurred, so by the time the bulk of the forces arrived toward the end of January, they were ready for whatever might occur. Once the main force arrived, TF LOG personnel were sitting around like the Maytag repairman in the commercial with nothing to fix.

The peak days for forces in the joint operating area were 6 to 12 February. During this period, most of the LSAs reached their peak capacity, and the Park City LSA exceeded its expected capacity by putting over 100 personnel on cots for 5 days. This was because JTF–O decided to put people closer to where they were needed. Thus, cots were used rather than transporting personnel long distances to work sites. Although the Park City LSA was the largest facility and had the greatest capacity to expand, its space limits still were strained.

The Governor of Utah was in Washington, D.C., to request additional funds from the Federal Government when the 11 September attacks occurred. These attacks, along with the bomb explosion at the Atlanta Olympic Games in 1996 and U.S. involvement in a war in Afghanistan, gave the Nation a keen awareness of the need for a safe Olympics. JTF–O was instrumental in ensuring that the 2002 Winter Olympic Games were a safe place for the athletes and spectators. Despite the short planning time, TF LOG successfully met the logistics needs of the military personnel who provided security for the Games. TF LOG's experience made it evident that DOD needs to develop standing operating procedures for ensuring security for large events that pose a high terrorism risk and last days or weeks. These procedures must address a range of contingencies such as supporting troops outside military installations. **ALOG**

Major Winfried E. Scheel was the support operations officer for Joint Task Force-Olympics. He is the S3 for the 4th Corps Materiel Management Center, 13th Corps Support Command, at Fort Hood, Texas. He has a B.S. degree from the University of North Alabama and is a graduate of the Quartermaster Officer Basic and Advanced Courses, the Support Operations Officer Course, the Combined Arms and Services Staff School, and the Army Command and General Staff College.

Where Do We Spend the Money?

by Dr. Miranda Keeney and Sean M. Connors

Managing the life-cycle costs of aging helicopter fleets requires better decision support tools.

Assessing the impact of operations and maintenance decisions on the life cycle of an aging aircraft fleet requires the ability to measure and respond to uncertainty. Forecasts of maintenance and parts requirements for fielded systems traditionally use historical repair and supply demand models. These models work well after a weapon system experiences several years of steady-state operation, but they tend to depend on a stable and somewhat regular operations and support structure.

Predictions based on data that capture cyclic trends as the fleet experiences standard operations, scheduled maintenance, and average component failure rates work best when components are relatively new. Aging aircraft systems, when combined with component populations of varying ages, can be affected adversely by changes in traditional maintenance and support concepts, or by the failure to make necessary changes. The right action for a new system might drive overall sustainment costs up while decreasing the readiness of an older system.

The Army Logistics Integration Agency is working closely with the Army Aviation and Missile Command (AMCOM) to develop better life-cycle weapon system models and analysis applications. The goal is to develop, test, and implement a time-dependent, stochastic analysis tool that can be applied to weapon systems whose parts are being tracked throughout their operational life. [Analytical models and equations are fixed calculations. A stochastic analysis is used to incorporate probabilities of events occurring at some magnitude. It samples variable distributions at various time intervals in order to average the outcomes to best fit predictions of future events.]

Closed-Loop Solution Requirements

Knowing a system's life-cycle characteristics and future behavior in advance allows the program or project manager to assess the combined cost-effectiveness of utilization, logistics support, and engineering improvement scenarios before they are implemented. A comprehensive evaluation of probabilistic [likely] fleet readiness and support costs requires a closed-loop analysis approach. Aspects of equipment configuration identification and location, operations, failure characteristics, multi-indentured repair capabilities, supply, and overall logistics responses must be evaluated under a single framework. ["Multi-indentured" refers to a breakdown of the hardware of a system. For example, aircraft would be the first indenture, modules the second indenture, assemblies the third, parts the fourth, and piece parts the fifth.]

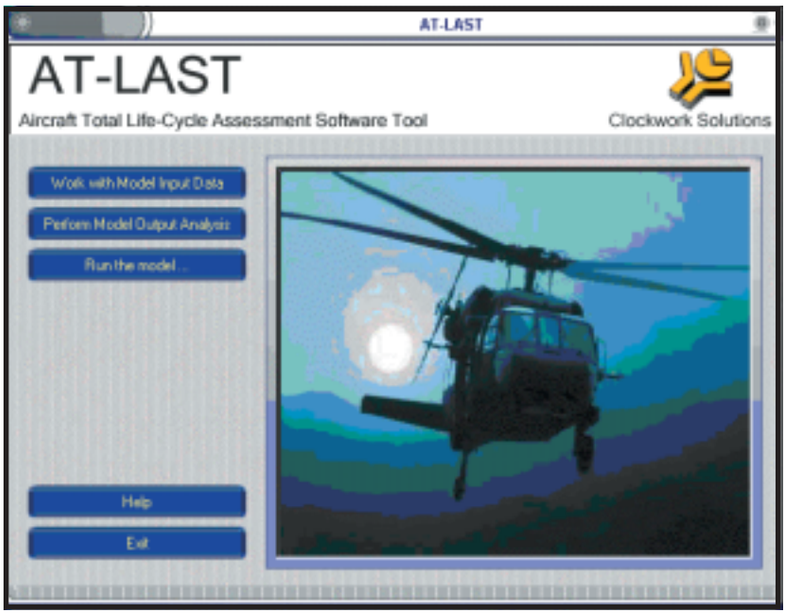
Some questions that may be asked to obtain a dataset needed to drive such a model and life-cycle analysis might be—

- What parts are installed on the system or line replaceable unit (LRU)?
- What are the reliability characteristics of those parts?
- Where is the system or LRU located?
- What is the operating tempo of the system?
- How is work routed throughout the maintenance levels and echelons?
- How are spares introduced and managed?
- What are the repair capacities?
- What are the repair times?

These questions result in an abundance of data that describe the time-dependent state of a fleet or component family's composition and age, operations profiles, maintenance requirements, and maintenance capabilities. Monte Carlo probabilistic simulation techniques become necessary to optimize the life-cycle behavior of such a complex, closed-loop system. ["Monte Carlo" is a sampling technique developed many decades ago. Simulation tools use it to analyze problems and develop forecasts based on stochastic equations.] However, simulation capabilities also must consider real-world phenomena, such as uncertain and incomplete data, component aging and maintenance, spare parts, variable demands on the system, and component interactions.

Developing the Solution

SPAR is a modeling and simulation technology used for predicting system behavior in order to reduce asset ownership costs and increase closed-loop system per-



☐ **The AT–LAST graphical interface is designed to minimize the effort needed to quickly input data and analyze different scenarios.**

formance. Note that the system consists of the equipment, equipment operations, maintenance actions, and varieties of logistics processes. SPAR models are based on statistics and rules that define, at a detailed level, how elements of a system and its support infrastructure behave dynamically over time. By modeling the details of element behavior and the relationships among elements, the performance of large, complicated systems can be predicted accurately.

The Aviation Total Life-Cycle Assessment Software Tool (AT–LAST) is a custom application built on top of the SPAR simulation engine and tailored to support Army aircraft overhaul and repair. AT–LAST has been built for ease of use. Users concern themselves only with changing limited inputs within a custom graphical user interface (see chart above), initiating a life-cycle simulation, and reviewing life-cycle results via textual and graphic outputs.

Input variables that can be modified easily to determine fleet readiness and cost impacts include—

- Flying hour programs by station location.
- Component age and reliability.
- Repair capacity and time.
- Life limits (the number of flight hours at which condemnation of the aircraft is required).
- Life-limit screens (opportunities to pull life-limited parts while the next higher assembly is in maintenance for another reason).
- Customer wait times.
- Spares acquisition schedules.

Leveraging Maintenance

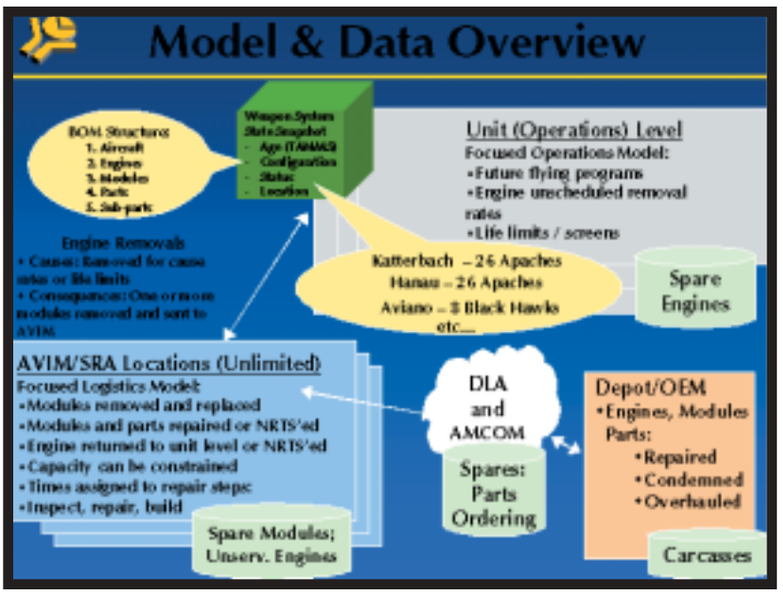
An initial application of AT–LAST has been completed and implemented for use on the T700 engine fleet. The T700 engine series data models used in AT–LAST include 5,585 engines of the T700, T701, and T701C configurations. The engines support a fleet of 720 AH–64 Apache and 1,480 UH–60 Black Hawk helicopters. Approximately 320,000 components are tracked by serial number throughout the life-cycle simulation. All engines, modules, parts, and subparts are included and tracked through the fifth indenture (piece parts) of the hardware configuration breakdown.

The state of the engine fleet was assembled through a combination of component removal and repair and overhaul records (Department of the Army [DA] Form 2410, Component Removal and Repair/Overhaul Record), monthly flight-hour status reports (DA Form 2408–19–3, Engine Component Operating Hours Record), and configuration tracking databases within the program management offices. The representation of the state of the fleet tells AT–LAST where everything is in the world, to what it is attached, how much life it has remaining, and whether it is installed, in repair, or a spare.

As an extension to the T700 databases, the Utility Helicopter Program Management Office has developed a Black Hawk family model consisting of 31 LRUs and their modules and subparts. This dataset is comprised of 1,499 aircraft and a total of 398,000 serialized assemblies, parts, and components. Multiyear simulations are assessing a wide variety of life-cycle impacts resulting from recapitalization plans for the aging fleet. Time-dependent forecasts produced include such data as assembly and component time on wing, age, system availability, life-cycle costs, logistics and repair total turnaround time, and achieved flying hours.

The chart at right shows a high-level process architecture for AT–LAST. AT–LAST simulates the behavior of engines for a defined duration and automatically generates failure, repair, maintenance, and supply events. Aircraft in the model fly according to a flying program projection or from statistical distributions that have been developed to represent the programs flown at every operating base in the past. Army personnel simulate the operation of the aircraft to achieve an equivalent number of flying hours per month per aircraft.

For each engine, AT–LAST generates failures representing unplanned removals that cause the engine to enter an existing three-level maintenance system. Upon



☐ AT–LAST is a comprehensive, closed-loop operations and maintenance model. (BOM=bill of materials. TAMMS= The Army Maintenance Management System. DLA=Defense Logistics Agency. SRA=specialized repair activity. NRTS= not reparable this station. OEM=original equipment manufacturer.)

engine failure, the simulation grounds the aircraft until a replacement engine is available from the spares pool. Failed engines are tagged as unserviceable and are queued for induction into a depot. Items are routed to appropriate maintenance-level locations, where they are inspected, torn down, routed, repaired, assembled, and finally shipped back to an appropriate serviceable-spares pool.

With this tool in place, a projected return on investment over time, in terms of readiness and costs, can be determined. This determination is based on decisions to replace various combinations of old parts with new parts or with components repaired to the new maintenance repair standard, or on decisions to increase or reduce—

- Part life limits.
- Life-limit screens.
- Repair capacity at aviation unit maintenance (AVUM), aviation intermediate maintenance (AVIM), or depot levels.
- Repair times (based on improved tooling or maintenance methods).
- Flying hour programs.
- Spares.
- Customer wait times.
- Fleet size.

More detailed impact analysis can be evaluated through outputs that include—

- Number of unplanned LRU removals.
- Number of LRU inductions for overhaul at the depot.
- Counts of depot actions for each type of assembly.
- Number of life-limit events for each type of assembly.
- Failure counts per type of assembly.
- Number of spares used.
- Awaiting parts (AWP) actions.
- Awaiting maintenance (AWM) actions.
- Readiness levels.
- Repair and maintenance costs.

AT–LAST will be used by AMCOM to quantify time-dependent life-cycle costs and impacts resulting from proposed Apache, Black Hawk, and T700-series engine sustainment decisions. AT–LAST T700 presents a comprehensive, closed-loop opportunity to measure the life-cycle sustainment effects of proposed or recently initiated recapitalization efforts. It provides a capability to assess decisions for the T700 fleet before they are implemented, enabling the Army to make the best use of every dollar spent and improve forecast accuracy.

AT–LAST and the T700 engine series databases have been delivered to the Maintenance Directorate at the Integrated Material Management Center (IMMC) of AMCOM. They currently are being used by the IMMC to evaluate engine recapitalization policies and prime vendor depot support initiatives and fleet impacts at Corpus Christi Army Depot, Texas. Initial Black Hawk family models were delivered to the Utility Helicopter Program Management Office and the AMCOM IMMC Maintenance Directorate in March. **ALOG**

Dr. Miranda Keeney is a strategic logistics program specialist in the Materiel Logistics Division at the Army Logistics Integration Agency. She is the program manager for the SPAR Modeling Program. She received a Ph.D. degree in industrial engineering and an M.S. degree in operations research from Pennsylvania State University. She is a graduate of the Army War College.

Sean M. Connors is the contractor program manager for the AT–LAST development project at Clockwork Solutions, Inc. He has an M.S. degree in industrial engineering from Texas A&M University and a B.S. degree in electrical engineering and is a graduate of the Army Materiel Command School of Engineering and Logistics.

Wheeled Vehicle Recovery Course

by Second Lieutenant Ronald E. Abiera

Fort Jackson, South Carolina, is the home of the Wheeled Vehicle Recovery Course, which awards additional skill identifier (ASI) H8, wheeled vehicle recovery, to soldiers who have military occupational specialties (MOSs) 63B and 63S (light- and heavy-wheeled vehicle mechanics).

The mission of the ASI H8 Wheeled Vehicle Recovery Course is to train Active Army, Army National Guard, and Army Reserve enlisted personnel to operate and maintain recovery vehicles and related equipment and to employ standard procedures for rigging, recovering, and towing wheeled vehicles. The 12-day course encompasses 84 hours of classroom and hands-on training and testing on the following tasks—

☐ **Students attempt to recover a vehicle from the "mire pit."**

- Oxygen and acetylene gas welding equipment operations.
- Recovery methods.
- Recovery vehicle preventive maintenance checks and services.
- Recovery vehicle operation.
- Boom and hoist operations.
- Winch operations.
- Mired vehicle recovery.
- Overturned vehicle recovery.
- Disabled vehicle towing.

Recovery training was once part of the 63B and 63S Advanced Individual Training Courses. However, in 1992 the Army Training and Doctrine Command eliminated recovery training from the curriculum, reducing the length of the 63B and 63S courses by 3 weeks each. Since that time, vehicle recovery has been designated as an ASI available to selected personnel in the 63-series MOSs.

During fiscal year 2001, 480 students successfully completed the ASI H8W course. Approximately 95 percent of the graduates were Active Army, while the remaining 5 percent were Army National Guard, Army Reserve, and international military students. Although units throughout the Army may send their soldiers to the course, the majority of the students are new soldiers who are preparing for their first unit assignments. While soldiers of any enlisted rank can attend the course, only those who are E–5 or below receive military credit for attendance.

The primary objective at the recovery training site is to conduct training safely and to standards. The professional and technically proficient noncommissioned officers (NCOs) who make up the cadre of the recovery course ensure that the course meets safety and regulatory standards. The course instructors are all seasoned 63-series NCOs with an average time in service of over 14 years. Though the job is challenging, these NCOs take great pride in their ability to mold hundreds of new soldiers each year into competent wheeled vehicle recovery specialists. **ALOG**

Second Lieutenant Ronald E. Abiera is a student in the Armor Officer Basic Course at Fort Knox, Kentucky. Previously, he was the training officer and executive officer for the 187th Ordnance Battalion at Fort Jackson, South Carolina. He has a B.S. degree in psychobiology from the University of California at Los Angeles.

Emulating Peripherals on Legacy Computer Systems

by David T. Dunn

In a world where a computer system built just 2 years ago is considered obsolete, maintaining the 10- to 20-year-old computer systems in use throughout the military can be a daunting task.

Today's military frequently relies on legacy systems that have long since been retired in the rest of the world. These systems are used in simulation, training, automatic test, missile tracking, and other critical applications. Often the manufacturers and integrators of these computer systems have gone out of business, or they will not provide support for equipment they consider past its projected lifespan. Add to this dire situation a deteriorating pool of spare parts and rotating support personnel, and conditions are ripe for chronic subsystem failures.

However, there is a solution for this situation that often is overlooked by logistics personnel, support contractors, and purchasing agents. That solution is the use of "emulated peripherals" to replace the wornout devices that originally came with the legacy computer systems.

The main points of failure on older computers are the devices with the most moving parts: the disk drives and tape drives. Unfortunately, it is difficult to obtain replacement parts for these peripherals, and often they are the most complicated equipment to repair.

Emulated disk drives and tape drives permit the use of modern small computer system interface (SCSI) devices on the existing controllers and cables of legacy computer systems. These devices work with the existing software and input/output (I/O) handlers. They are called "emulated" peripherals because they have a signal conversion capability—usually a small computer inside the chassis—that allows them to appear to the controller exactly like the wornout devices they have replaced.

Besides the obvious advantage of being able to upgrade a 10-year-old disk or tape drive by installing an SCSI device, other benefits to using emulated peripherals are—

- ***Increased floor space.*** With an upgrade to emulated peripherals, a row of freestanding disk or tape drives can be reduced to fit into a single cabinet. The additional floor space can eliminate the need to expand computer operations facilities.
- ***Lower power consumption.*** Older disk and tape drives consume a significant amount of electricity. A well-designed emulator uses no more power than a standard light bulb.
- ***Increased capabilities.*** While the first goal of emulation is to make the new device work as a plug-and-play replacement, there are other benefits such as increased I/O speed and additional storage capability. The new device can run continuously at the maximal speed of its controller, because emulation eliminates data bottlenecks. In the case of disk emulation, the entire disk image can be stored in solid-state memory, thereby eliminating seek times and I/O delay.

By taking advantage of the onboard backup capability available in an emulated peripheral, saving data will take seconds or minutes, not hours as is often the case with older peripherals. Shorter save times mean more frequent backups and a safer environment for critical data storage.

SCSI disks have much more capacity than older devices, so the maximal disk size allowed by the controller or software can be programmed into the emulated device. Partitions can be added to create multiple disk images. Also, modern data storage enhancements such as disk mirroring are available.

Recent Government studies show that after varying periods, there is a natural deterioration of storage capacity of all types of disk and tape media. This deterioration can occur even in optimal temperature and light conditions. The best way to prevent the potential loss of critical data is to use a more modern and stable storage medium, such as a magneto optical (MO) cartridge, dynamic address translator (DAT) tape, compact disk (CD), or digital video disk (DVD). Emulated peripherals provide the capability to transfer critical data to modern media before they are lost forever.

Emulated disk drives and tape drives are already used to a limited extent by the U.S. military. The main obstacle to wider use of these devices is the lack of knowledge within military logistics organizations about their existence, value, and capabilities. The companies that make emulated computer peripherals tend to be small businesses with small advertising budgets. The key to more widespread use of this proven, economical technology is a broader education effort within military logistics organizations. Logistics personnel cannot seek alternative solutions unless they know they exist.

In this era of tight budgets and decreased funding, it is reassuring to note that emulated peripheral devices will pay for themselves—often within the first 12 months of use. The cost of switching to these devices will be recouped quickly through greater system availability, lower support costs, minimal energy consumption, reduced data loss, and increased computer-room floor space. **ALOG**

David T. Dunn is a regional manager for Arraid, Inc., a manufacturer of disk and tape emulation products.

Commentary

Casualties as CCIR

by Colonel David L. Nolan

Identifying the commander's critical information requirements (CCIR) was the topic of two articles in the January-February 2002 issue of *Army Logistician*. Lieutenant Colonel Kevin T. McEnery's "Critical Logistics Information and the Commander's Decisions" noted, "Only rarely are CCIR linked clearly to the type of battlefield observations that drive command decisions." In "Commander's Critical Information Requirements: An NTC Perspective," Lieutenant Colonel Judith Lemire observed, "Brigade-level decisions . . . are not analyzed for CSS [combat service support] decision points and CCIR." Both articles alluded to casualties as a potential form of CCIR. If the articles were written to stimulate additional dialog, they achieved their objective.

Perhaps a CCIR should relate casualties to a culminating point. Field Manual (FM) 3–0, Operations, notes, "Beyond their culminating point, attackers risk counterattack and catastrophic defeat and continue the offense only at great peril . . . Attackers culminate through friction caused by their own . . . losses . . ." [According to FM 3–0, "In the offense, the culminating point is that point in time and space where the attacker's effective combat power no longer exceeds the defender's or the attacker's momentum is no longer sustainable, or both."] FM 101–5, Staff Organization and Operations, indicates, "The CCIR directly affect the success or failure of the mission and they are time-sensitive in that they drive decisions at decision points." So a casualty CCIR related to a culminating point would provide the tactical commander with a time-sensitive data point for tactical decisions. The decision would be to continue or change the mission, but it would be made consciously and knowing the consequences.

Actually linking a casualty CCIR to the culminating point is implied in the personnel estimate process. According to FM 101–5, "The personnel estimate predicts losses . . . and when, where, and if such losses cause the culmination of an operation." Of course, the G1 (or S1) cannot produce the casualty estimate in a vacuum. The estimate requires coordination and collaboration with the G2 (or S2) and G3 (or S3). This approach might help break a bad habit in some units: looking to the surgeon for the casualty estimate.

It is true that surgeons and medical planners are vitally interested in the casualty estimate since it produces their anticipated medical workload. The medical workload results from casualties who do not die immediately but have sustained life-threatening or other injuries requiring medical attention. However, an experienced medical planner will know roughly how many patients can be evacuated and treated during a specified time period. So knowing evacuation and treatment capabilities may provide useful insights to a potential second casualty-related CCIR: mass casualties.

Under FM 8–55, "The term mass casualties means that a large number of casualties has been produced simultaneously or within a relatively short period of time." More importantly, it means "that the number of patients requiring medical care exceeds the medical capability to provide treatment in a timely manner." However, the definition of a large number of patients is relative to both sheer numbers and the mix of patients. Five minimally injured patients may not be a mass casualty situation for the medic and might not encumber the tactical commander. But three clinically urgent patients are a mass casualty situation for a single medic. Whether a mass casualty encumbers the tactical commander is another question. The tactical situation will influence the decision to evacuate patients, hold them in place, or move them with the unit. This decision may influence, from the tactical perspective, whether a mass casualty situation becomes a CCIR or not.

No doubt relating casualties to a culminating point and CCIR will open a Pandora's box. So will relating a mass casualty situation to CCIR. In both cases, CCIR should be considered in light of their cascading consequences on the combat commander. The dialog stimulated by Lieutenant Colonels McEnery and Lemire is important and should continue.

Colonel David L. Nolan is the assistant commander for force integration at the Army Medical Department Center and School at Fort Sam Houston, Texas. He previously served as commander of the 62d Medical Group, chief of staff of the 1st Corps Support Command, and executive officer of the 25th Division Support Command.

626th Logistics Task Force Keeps Supplies Flowing in Kandahar

The 626th Logistics Task Force (LTF) controls most of the supplies that enter Kandahar Airfield and some of the supplies that arrive at Bagram Airfield in Afghanistan. "Everything goes through the 626th in one capacity or another," said Major Larry Naylor, 626th LTF executive officer.

When supplies arrive at Kandahar Airfield, they are separated into their appropriate classifications. General supplies are sent to Company A, maintenance supplies to Company B, and medical supplies to Company C.

Company A controls the main supply warehouse, ammunition supply point, fuel distribution point, water distribution point, and shower point. The company also provides hot meals for soldiers at Kandahar Airfield.

☐ **A 626th Logistics Task Force soldier prepares to load a stack of tires at Kandahar Airfield.**

The supply warehouse is the central distribution point for military clothing, expendable items (such as office supplies), barrier materials (such as sandbags, wood, and concertina wire), high-dollar items (such as weapons and vehicles), and repair parts.

At the ammunition supply point, units may draw ammunition and store it there in separate containers. Later, when they need to draw ammunition, they can skip the lengthy paperwork and go directly to their stockpile to get it.

The fuel distribution point provides bulk storage for all ground vehicles and rotary- and fixed-wing aircraft that come through Kandahar Airfield. All of the fuel used at the airfield is JP–8 (jet propellant)-grade fuel. Petroleum laboratory technicians test the fuel for contaminants before it is pumped into the storage area. Filter efficiency is tested daily, and "aqua glow" tests are performed to determine the amount of water in the fuel. (The water content in Army and Air Force aviation fuel must not exceed 10 parts per million; in Navy and Marine Corps aviation fuel, the water content must not exceed 5 parts per million.)

Company A also operates the water supply point, where potable water is purified using a reverse osmosis water purification unit. The water supply point is open around the clock, pumping more than 75,000 gallons of water a day to supply potable and nonpotable water to troops at Kandahar Airfield. Preventive medicine specialists test the water biweekly to make sure it is safe to drink. A plentiful supply of good water helps ease the daily stress for the airfield's personnel.

Thanks to Company A's efforts, hot showers are now a welcome part of the day, and freshly prepared hot meals provide a pleasant change from the monotony of daily meals, ready to eat.

Company A also stocks replacement parts for all ground vehicles at Kandahar Airfield, but it performs only basic organizational maintenance such as oil changes and headlight replacement. Company B takes over when a vehicle needs major repairs, such as an engine replacement.

Company C oversees the airfield's medical facilities, dispenses medication, and provides services ranging from bandaging a cut to extracting a tooth.

Naylor compared the 626th LTF's mission to an adage often heard among logisticians: "When . . . you pull out your pistol and level it at your adversary, the difference between a click and a bang is *logistics!*" That's what the soldiers of the 626th LTF do—provide the mission-sustaining logistics that provides other soldiers in Afghanistan with a "bang" instead of a "click" as they support Operation Enduring Freedom. **ALOG**

The Army Logistician *staff thanks Private First Class Christopher Stanis, 314th Press Camp Headquarters, for providing information for this article.*

‘We Will Not Relent’: The Army’s Role in America’s War on Terrorism

Six months after last year’s 11 September terrorist attacks, President George W. Bush vowed he would not relent in the struggle for the freedom and security of America and the civilized world. “The second stage of the war on terrorism,” the President said, calls for “a sustained campaign to deny sanctuary to terrorists who would threaten our citizens from anywhere in the world.” The photos on these pages provide a brief look at some of the Army’s men and women who have taken on the President’s pledge to rout terrorists in Afghanistan as part of Operation Enduring Freedom. **ALOG**

☐ Top left, a soldier with the 1st Battalion, 187th Infantry Regiment, 101st Airborne Division (Air Assault), from Fort Campbell, Kentucky, watches for enemy movement in the Shahi Khot mountain range in eastern Afghanistan during Operation Anaconda. Lower left, a soldier from the same battalion mans a .50-caliber machinegun during a battle. Above right, soldiers from the 1st Battalion scan the nearby ridgeline for enemy movement.

☐ **In the top photo, an Army chaplain blesses an aircraft to be used in Operation Anaconda. Above left, a petroleum supply specialist from the 264th Supply Company, 1st Corps Support Command, Fort Bragg, North Carolina, operates an aircraft refueling pump at Bagram Airfield. Above right, armament repairmen from the 3d Battalion, 101st Aviation Regiment, 101st Airborne Division (Air Assault), remove a piece of maintenance equipment from the front of an AH–64 Apache helicopter destined for battle. At left, a petroleum laboratory specialist from the 260th Quartermaster Battalion, 24th Corps Support Group, Hunter Army Airfield, Georgia, tests a vial of Jet A–1 fuel to determine the additive composition necessary to produce JP–8 fuel.**

—Story by Janice L. Simmons

NEWS

(News continued from page 1)

year's conference was to provide a forum for combat service support commanders to discuss the issues they face in achieving the Army's transformation objectives and to share information on current and emerging logistics initiatives.

The group was briefed on the status of the doctrine, training, leader development, organization, materiel, and soldier systems (DTLOMS) that provide the operational and organizational structure to support the interim brigade combat team (IBCT). The attendees talked about the differences between Army of Excellence and Force XXI structures and the Army's ability to provide the necessary combat service support to the IBCT. A recurring topic was the need to reduce the logistics footprint by limiting the infrastructure, using fewer resources, and applying best business practices. General Solomon stated that, to create the objective force, the logistics footprint must be reduced by 50 percent. Those attending the conference were assured that the Army is making significant headway toward achieving that goal.

The need for improved deployability was stressed, and options were proposed for rapidly concentrating combat power in any operational area. The senior leaders suggested better ways to sustain the force, including reducing fuel consumption, increasing water generation capabilities, expanding power and energy efficiencies, building reliable and easily maintainable systems, and ensuring interoperability of systems.

Several presentations addressed automation initiatives that will bring together tracking and reporting functions and create one system to support distribution, storage, maintenance, and other supply and transportation tasks. The group learned about improvements that have been made to the Joint Deployment Logistics Model, which is designed to assist commanders and their staffs in decisionmaking during mobilization, deployment, reception, staging, onward movement, and integration. The leaders in attendance acknowledged that the Army needs to conduct real-world logistics simulation exercises and more command and staff collective training. Although the Army has improved its sustainment capabilities, the initiatives have not been tested in a major exercise.

Participants were updated on the conversion from four-level maintenance to a two-level maintenance system, in which maintenance tasks are divided between parts replacement and system repair. They also discussed the Logistics Transformation Task Force, which is a broad initiative recently introduced by the Army Chief of Staff, General Eric K. Shinseki. The task force will synchronize the many logistics transformation initiatives underway and identify new processes and procedures that will help the Army achieve its transformation goals. The task force is soliciting good ideas for transforming logistics from all Army soldiers and civilians, and the decisions and milestones for implementation will be presented to General Shinseki on or before 1 August.

NEW UNIFIED COMMAND CREATED

Changes to the Unified Command Plan announced in April by Secretary of Defense Donald H. Rumsfeld and Chairman of the Joint Chiefs of Staff General Richard B. Myers, U.S. Air Force, include the creation of a new unified command—the U.S. Northern Command. The new command, which likely will stand up 1 October at Peterson Air Force Base, Colorado, will be responsible for homeland defense and also oversee the North American Aerospace Defense Command (NORAD), a U.S.-Canada command. The current NORAD commander also commands the U.S. Space Command. Under the provisions of the revised Unified Command Plan, the U.S. Space Command will have a separate four-star commander. The revised plan also—

- Designates geographic areas of responsibility for all combatant commanders and assigns them responsibility for security cooperation and military coordination with all countries in their regions.
- Shifts the U.S. Joint Forces Command's geographic area of responsibility to the U.S. Northern Command and U.S. European Command. This enables the Joint Forces Command to focus on transforming U.S. military forces.
- Designates the continental United States, Canada, Mexico, and portions of the Caribbean region as the U.S. Northern Command's area of responsibility. Alaska is included in this assignment, but Alaskan Command forces remain assigned to the U.S. Pacific Command.
- Assigns responsibility for security cooperation and military coordination with Canada and Mexico to the commander of the U.S. Northern Command.
- Includes Russia and the Caspian Sea in the area of responsibility assigned to the U.S. European Command; the U.S. Pacific Command retains responsibility for certain activities in eastern Russia.
- Includes Antarctica in the area of responsibility assigned to the U.S. Pacific Command.

The role of the Army in the Northern Command has not been determined.

The Unified Command Plan provides guidance to all

unified commanders, establishes their missions and responsibilities, and delineates the general geographic area of responsibility for combatant commanders. The current Unified Command Plan was approved in September 1999. The events of 11 September 2001 and the ensuing war on terrorism, as well as the new defense strategy outlined in the 2001 Quadrennial Defense Review, highlighted the need for changes to the plan.

DOD PLAN OUTLINES COMPREHENSIVE APPROACH TO MANAGING MUNITIONS

The Department of Defense (DOD) has released a Munitions Action Plan that is designed to improve the life-cycle management of conventional military munitions in all of the armed services. The goal of the plan is to ensure that the military has the munitions it needs to maintain force readiness while maximizing explosives safety for military personnel and improving DOD's environmental stewardship.

The plan is intended to address increasing concerns, both within DOD and by the general public and Government regulators, about the impact of DOD munitions programs on the environment, including the operation of training and test ranges.

The plan was developed by the Operational and Environmental Executive Steering Committee for Munitions (OEESCM), which was chartered by the Defense Environmental Security Council. The council advises the Under Secretary of Defense for Acquisition, Technology, and Logistics on environmental matters that affect DOD's mission.

The OEESCM's charter directed it to follow a life-cycle approach in developing the plan. The committee defined the munitions life cycle as having five phases—

- Acquisition and production of munitions, including munitions-related research and development.
- Stockpile management, including packaging, storage, transportation, surveillance, and maintenance.
- Use, including munitions used in training, testing, and military operations and management of training and test ranges.
- Demilitarization, including disposition of excess, obsolete, and unserviceable munitions; and resource recovery and recycling, treatment, and disposal of waste munitions.
- Response or response actions, which address cleanup or disposal of munitions left on ranges that are no longer operational.

The plan sets 29 objectives for meeting the goals of readiness, safety, and environmental stewardship and assigns responsibilities and milestones for accomplishing those objectives to DOD organizations. The current estimated cost for implementing all of the objectives is approximately $207 million for fiscal years 2002 through 2008.

MAINTENANCE AWARDS PRESENTED

The winners of the 20th annual Army Awards for Maintenance Excellence for fiscal year 2001 are as follows—

Active Army Modification Table of Organization and Equipment (MTOE) Units

Small. Company A, 201st Forward Support Battalion, 1st Infantry Division (Mechanized), Vilseck, Germany.
Medium. 71st Ordnance Company (Missile Maintenance), 18th Corps Support Battalion, 16th Corps Support Group, 3d Corps Support Command, Babenhausen, Germany.
Large. 6–32d Field Artillery Battalion (Multiple Launch Rocket System), 212th Field Artillery Brigade, III Corps Artillery, Fort Sill, Oklahoma.

Active Army Table of Distribution and Allowances (TDA) Units

Small. Ground Mobility Division, 1–81st Armor Battalion, 1st Armor Training Brigade, Fort Knox, Kentucky.
Medium. 52d Signal Battalion, 5th Signal Command, Stuttgart, Germany.
Large. 3–6th Air Defense Artillery Battalion, 6th Air Defense Artillery Brigade, Fort Bliss, Texas.

Army National Guard MTOE Units

Small. Headquarters and Headquarters Detachment, 232d Corps Support Battalion, Springfield, Illinois.
Medium. 152d Maintenance Company, Augusta, Maine.
Large. 232d Corps Support Battalion, Springfield, Illinois.

Army Reserve MTOE Units

Medium. 353d Transportation Company, Buffalo, Minnesota.
Large. Headquarters and Headquarters Company, 311th Corps Support Command, Los Angeles, California.

ARMY SSF WINS DOD SUPPLY CHAIN OPERATIONAL EXCELLENCE AWARD

The Army Single Stock Fund (SSF) initiative was selected as the winner of the 2001 Department of

Defense (DOD) Supply Chain Operational Excellence Award. The SSF received the award based on an assessment of its background, goals, metrics, and potential broad application of the business process reengineering design. Allen Beckett, Principal Assistant to the Deputy Under Secretary of Defense for Logistics and Materiel Readiness, presented the award to Sue Baker, Director of the SSF, and Major General Larry Lust, the Army Deputy G4, on 23 April during the Supply Chain World North America Conference in New Orleans, Louisiana.

NEW ALMC COURSE PREPARES LOGISTICIANS FOR MULTINATIONAL ASSIGNMENTS

The Army Logistics Management College (ALMC) at Fort Lee, Virginia, has developed a course to prepare military and civilian personnel for positions in which they will be involved in multinational logistics. The pilot offering of the 1-week Multinational Logistics Course will begin 30 September 2002.

The course will discuss logistics organizations and

MTMC COORDINATES CREATIVE RESUPPLY MISSIONS

Using innovative traffic management techniques, the Military Traffic Management Command's (MTMC's) Kuwait detachment, the 831st Transportation Battalion, used an Army supply vessel twice recently to help speed critical cargoes to warfighters in the U.S. war on terrorism.

☐ **An Australian helicopter hovers above the *LTG William B. Bunker* for a unique sea-to-air uploading.**

☐ **A container is transferred from *the SS Cornhusker State* to the smaller *LTG William B. Bunker*.**

In the first instance, MTMC was asked by Camp Doha, Kuwait, to help deliver critically needed parts for Australian helicopters. An Army Reserve officer serving as the acting commander of the 831st Transportation Battalion contacted the captain of the *LTG William B. Bunker*, a logistics support vessel based at Fort Eustis, Virginia, and proposed a unique means of delivery. A slingload of aircraft repair parts was put on the vessel, which stood off in the Persian Gulf, and an Australian helicopter lifted the needed parts directly from the vessel's deck. Army crewmembers on the *Bunker* secured the slingloads for the lift up to the helicopter and the journey back to a waiting Australian naval vessel.

In another joint mission, MTMC and crewmembers aboard the *Bunker* conducted the first U.S. instream upload of ammunition in the Persian Gulf. Their mission was to deliver a resupply of Hellfire missiles.

The missiles were on board the Military Sealift Command's (MSC's) *SS Cornhusker State*, an auxiliary crane ship, but they could not be discharged because they exceeded the limit allowed in the Kuwaiti port. Working closely with MSC representatives, the 831st Transportation Battalion soldiers developed a way to discharge the missiles instream from the *Cornhusker State* to the *Bunker*.

For the discharge, the captain of the *Bunker* carefully navigated the vessel alongside the bigger vessel, and cranes on the *Cornhusker State* lifted the missiles onto the *Bunker*. Because the *Cornhusker State* is so much larger than the *Bunker*, the crane operator had to rely on signalmen aboard the two vessels to help him complete the discharge successfully.

support within the North Atlantic Treaty Organization (NATO), the United Nations, and coalitions and provide an overview of United States and multinational doctrine, information, and guidance. It especially will cover the new Joint Publication 4–08, Joint Doctrine for Logistic Support of Multinational Operations, and discuss a number of related topics, such as interoperability; host nation support; interagency operations; acquisition cross-service agreements; the American, British, Canadian, and Australian Armies Standardization Program; and NATO Standardization Agreements.

The intended audience for the course is majors and lieutenant colonels in all services and components; GS–12 to GS–14 civilians; international officers; and contractors (who must pay to attend). Waivers are available for captains and colonels. Students normally will be employed in, or on their way to, a job that will involve them in multinational logistics. However, because multinational operations can occur on very short notice, all officers at the appropriate levels should consider taking the course.

For more information on the Multinational Logistics Course, call (804) 765–4341 or DSN 539–4341 or send an email message to weatherille@lee.army.mil.

ARMY ACCESSIONS COMMAND ACTIVATED

The Army Accessions Command (AAC) was activated 25 March to oversee recruiting and initial training of officers and enlisted soldiers. AAC is composed of the Army Recruiting Command at Fort Knox, Kentucky, the Army Cadet Command at Fort Monroe, Virginia, and the Army Training Center at Fort Jackson, South Carolina. AAC is headquartered at Fort Monroe as a subordinate command of the Army Training and Doctrine Command (TRADOC). AAC's mandate is to make the total accession process more efficient and effective.

The Army Recruiting Command is responsible for recruiting enlisted soldiers, and the Army Cadet Command recruits officers through its Reserve Officer Training Corps detachments and battalions around the country. The two organizations have similar functions and will complement each other.▫ For example, the Army Recruiting Command's Program Analysis and Evaluation Section will expand its research capability to take on some functions of officer recruiting, retention, and research.

With the establishment of AAC, the Army is changing its training focus for new soldiers and officers. New soldiers will know when they enter basic training what their initial unit will be and will receive "assignment-oriented" training that teaches common tasks and how to use the equipment they will encounter at their first duty assignments. With assignment-oriented training, less relevant tasks that currently are included in initial training will be eliminated, and the program will focus on critical tasks. By doing this, the training time can be shortened, but soldiers will be fully trained on 95 to 100 percent of their critical tasks. (With the traditional approach, soldiers are fully trained on only 78 percent of their critical tasks.)

The command also will oversee conversion of more military occupational specialty (MOS) advanced individual training (AIT) courses to one station unit training (OSUT), which is a combination of basic combat training and AIT. With OSUT, drill sergeants and instructors get to know the new soldiers better. Critical-task training can be interwoven with basic training to show soldiers how their jobs will apply to field units. Moreover, the military indoctrination process in OSUT lasts much longer than 9 weeks, allowing soldiers to work on relationships and teamwork earlier in their careers. There are currently seven MOS-producing OSUT courses.

Under a proposed TRADOC officer education transformation initiative, newly commissioned officers will undergo their active officer initial military training through basic officer leadership courses (BOLCs). BOLCs will establish a baseline for all officers, regardless of branch, officials said. Each new officer will be taught the fundamentals of small-unit principles and equipped with the confidence and competencies he needs to make a dramatic contribution on arrival at his first unit.

WAYS TO IMPROVE JOINT LOGISTICS PLANNING STUDIED

The Army Developmental Test Command is taking a comprehensive look at the processes used in joint force logistics planning. In a feasibility study for a concept called Joint Logistics Planning Enhancements (JLOG/PE), command staff and contractors are examining the planning and reporting processes used by joint force commanders.

JLOG/PE will enhance joint force business processes in order to improve the use of existing logistics systems and thus help joint force commanders and logisticians obtain the most accurate logistics information. JLOG/PE is focusing initially on fuel and munitions, though it eventually will apply to all classes of supply.

The feasibility study is scheduled for completion in September. If it is approved by the Department of Defense's Deputy Director for Developmental Test and Evaluation, JLOG/PE will begin a 3- to 4-year test and evaluation program.

☆U.S. GOVERNMENT PRINTING OFFICE: 2002–432-782-00017

Coming in Future Issues—

- Technical Competence Versus Jack of All Trades
- Anticipatory Logistics
- Packaging Military Equipment for Overseas Shipment
- Ensuring the 'Special' in Special Operations
- Chemical Warfare Service in World War II
- Situational Awareness and FSB Battle Command
- Deploying Medical Units
- Information Management in the Brigade Rear Command Post
- Designing a Lieutenant Professional Development Program
- Transforming Finance
- Victory in the Division Rear Fight
- The Attack on Attu
- The Light Support Company in Heavy-Light Operations
- Logistics Lessons Learned by Lieutenant Grant in Mexico
- Determining Cargo-Handling Requirements
- Sergeant's Time Training in CSS Units

ISSN 0004–2528
DEPARTMENT OF THE ARMY
ARMY LOGISTICIAN
US ARMY LOGISTICS MANAGEMENT COLLEGE
2401 QUARTERS ROAD
FORT LEE VIRGINIA 23801–1705

Official Business

PERIODICALS POSTAGE
AND FEES PAID
AT PETERSBURG VIRGINIA
AND ADDITIONAL CITIES